ICE AND Refrigeration

BRING DOWN COSTS

Keep refrigerating compressors clean and efficient with TEXACO CAPELLA OILS

LOWER compressor maintenance costs . . . greater compressor efficiency . . . you assure both when you lubricate with *Texaco Capella Oils*. These highly refined, highly stable oils are moisture-free, do not react with refrigerants. They keep cylinders, valves and coils clean.

Texaco Capella Oils also have very low pour tests. Count on them to keep your compressors in shape to deliver maximum refrigeration at minimum cost.

You can get *Texaco Capella Oils* in the proper viscosities for your particular compressors and operating conditions. A Texaco Lubrication Engineer will gladly help you select them. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

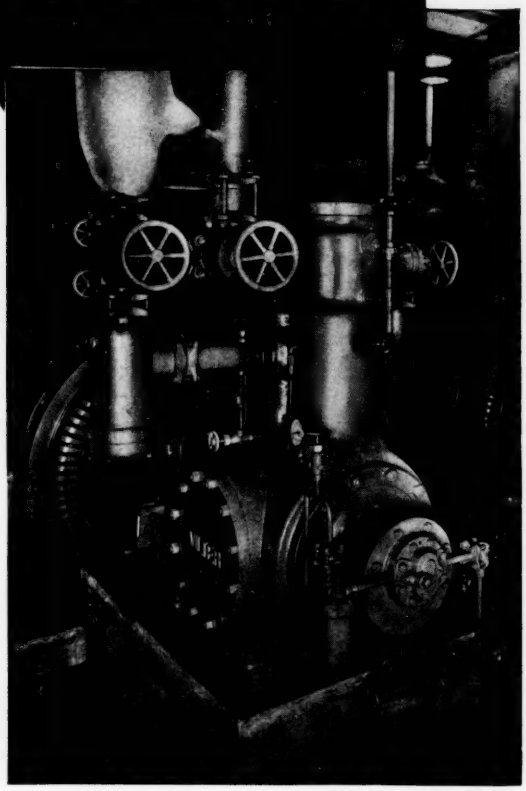


Photo courtesy Vilter Mfg. Co.

TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

TEXACO

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

ICE AND REFRIGERATION, Vol. 118, No. 2. Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $3.00 per year; other countries, $4.00. Single copies, 35 cents. Copyrighted 1950 by Nickerson & Collins Co. Entered as second-class matter August 8, 1891, Chicago, Ill., under the Act of March 3, 1879. Additional entry at Beloit, Wisc.

Pipe Coils • Direct Expansion Water Coolers • Shell and Tube Condensers • Industrial Unit Coolers • Oil Separators • Evaporative Condensers

Rolled-in or welded tubes—or with LOCK-NUT Construction

LOCK-NUT CONSTRUCTION
Acme's exclusive Lock-Nut Construction of ammonia condensers makes it easy to replace tubes in the field. No special tools are required to replace; merely remove the gaskets, pull out the pipe tube and put in the new one. Write for descriptive folder.

Acme

AMMONIA CONDENSERS

Acme ammonia condensers are "TAILOR-MADE" to operate with available water temperatures and volumes. A full range of models, types and sizes (capacities from two-tons to 200-tons) permits exact specifications to fit practically every application or condition. Acme ammonia condensers comply with ASME Code U-69 and provide low-cost and lasting performance. For original equipment or replacement specify Acme. It's easy to select the right model from Acme Catalog 21-B. Write for yours today.

ACME PRODUCTS

ACME INDUSTRIES, INC.
JACKSON, MICHIGAN
Representatives in Principal Cities

CONTINUOUSLY SERVING THE REFRIGERATION INDUSTRY SINCE 1919

Extra Ice Sales . . . Extra Profits
Automatically Yours!

1950 LINE OF POLAR ICE VENDING EQUIPMENT

Polar Vendors and Stations are silent salesmen that are on duty day and night making cash sales for you! Your customers will appreciate the fact that they can serve themselves in ten seconds from conveniently located Polar units which provide automatic ice service 24 hours a day, every day of the year.

Besides collecting for every nickel's worth of ice you sell, Polar equipment will also keep a permanent record of sales made for each vendor is equipped with an automatic counter.

All Polar vendors have the famous coin accumulator which adds the customer's change in nickels, dimes and quarters to make a set sale. It rejects slugs and foreign coins and returns the customer's money when the conveyor belts are empty. This coin unit is housed in a strong box which is completely burglar-proof.

Polar Ice Stations are sturdily built of heavy gauge aluminum and insulated with 6½" of high density Fiberglas, completely vaporsealed. Surplus power refrigeration units further insure economical operation, and zero temperatures are guaranteed at 95° temperature difference.

Polar Ice Vending Equipment is guaranteed against defects in materials and workmanship . . . guaranteed to give you satisfactory service. Prices are F.O.B. your station in car lot orders or on orders totalling $7500.00 or more.

You can depend on Polar Equipment to boost your sales and profits. We invite you to investigate now the profit possibilities of merchandising ice the Polar way. With Polar equipment you'll increase your volume of business and at the same time LOWER YOUR DISTRIBUTION COSTS!

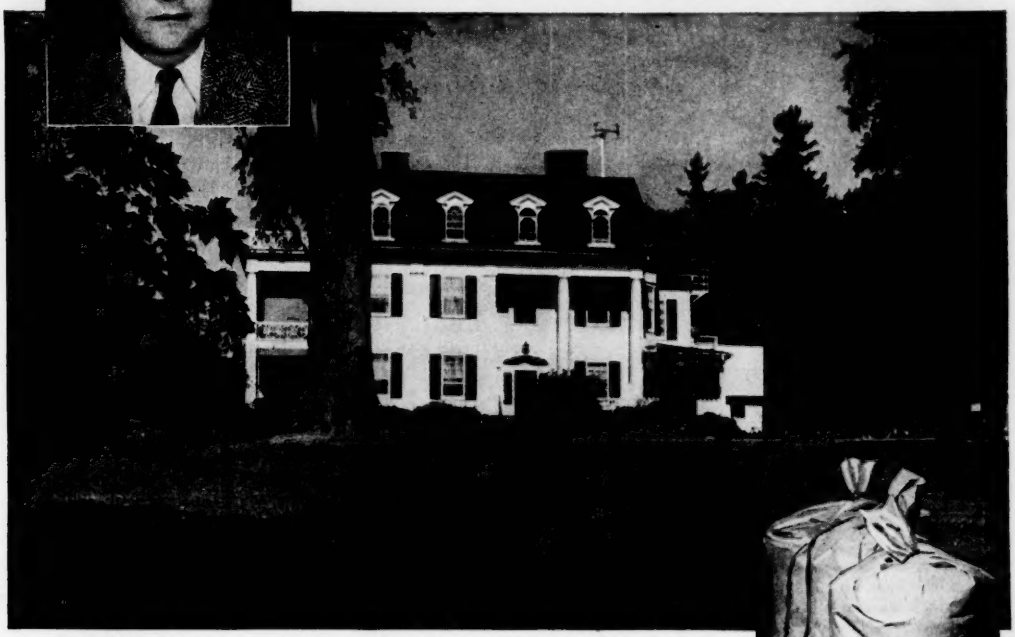
WRITE TODAY FOR COMPLETE INFORMATION

REFRIGERATION ENGINEERING COMPANY

211 Foshay Tower, ● **Minneapolis 2, Minnesota**

"Our sanitary standards demand Packaged Processed Ice"

SAYS JOSEPH J. HACK, JR. OWNER-MANAGER, WESTLEIGH INN, LITCHFIELD, CONN.



The Westleigh Inn is one of the top-flight inns of New England. And the village of Litchfield, ten miles from the nearest railroad station and 33 miles from Hartford, is a "storybook" New England village.

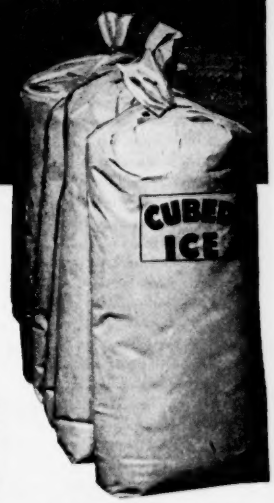
Why Leading Ice Companies Are Switching to One-Trip Ice Bags

IT'S EASIER to sell processed ice to big volume users such as restaurants and food markets when you pack it in one-trip paper bags that lock out dirt and contamination.

For sanitation is the Number 1 concern of all who sell food . . . so vital that some prefer to invest in expensive, ice-making equipment rather than take a chance with nonpackaged ice.

And think of the extra advantages for you! Consumers ice more often with convenient-sized, easy-to-handle Union Paper Ice Bags. They're easily carried, and so speed up handling on the platform, in loading and at the delivery point. And the double layer of Union wet-strength paper acts as an insulator to retard melting.

A revolutionary idea not so many months ago, Union Paper Ice Bags are now used by hundreds of ice companies. Write for further information and free samples.



Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet . . . thanks to a water repellent resin that binds the fibres of the paper firmly together.

ONE TRIP

UNION Paper Ice Bags

A product of the UNION BAG & PAPER CORPORATION • Woolworth Bldg., New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

Here's Nation-wide Distribution

OF DU PONT "NATIONAL" ANHYDROUS AMMONIA

the ammonia that's always pure—uniform—dependable—dry

Wherever you are, you'll have no trouble getting quick delivery of "National" Cylinder Anhydrous Ammonia. Order from the conveniently located distributors below. In addition, warehouse stocks of "National" Ammonia are spaced across the country to further insure prompt delivery.

And "National" Ammonia is 99.99% pure . . . always use it to keep your refrigeration equipment operating at peak efficiency. It's pure, uniform, dependable and dry. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Wilmington 98, Delaware.

BRANCH OFFICES:

350 Fifth Avenue, New York 1, New York
7 South Dearborn Street, Chicago 3, Illinois
818 Olive Street, St. Louis 1, Missouri

Quick service from these Du Pont "National" Ammonia distributors

MASS.—Boston	A. E. Borden Co., Inc.
R. I.—Providence	Borden & Remington
CONN.—Waterbury	Apothecaries Hall Co.
NEW YORK—Buffalo	Buffalo Brewers Supply Co.
Rochester	Scobell Chemical Co., Inc.
Syracuse	Eastern Chemicals, Inc.
N. J.—Newark	National Oil & Supply Co.
MD.—Baltimore	Leidy Chemicals Co.
D. C.—Washington	Henry M. Sweeny Co.
VA.—Norfolk	Refrigeration Supplies
Richmond	A. R. Tiller
KY.—Louisville	Louisville Mill Supply
GA.—Savannah	Coastal Chemical Company
FLA.—Jacksonville	Apperson Chemical Company
Tampa	Graves Bros. Refrig. Supplies Co., Inc.
OHIO—Cincinnati	John H. Schafer, Inc.
Cleveland	The Cleveland Brewers Supply Co.
Columbus	Parke Pettigrew & Son Co.
OKLA.—Oklahoma City	Meyer-Blanke Co.
Tulsa	Meyer-Blanke Co.
IND.—Indianapolis	Wm. Lynn Chemical Co.
IOWA—Sioux City	Kennedy & Parsons
MICH.—Detroit	Davis Supply Co.
MINN.—Minneapolis	Vincent Refrigeration Supply Co.
St. Paul	Hauser & Sons Malting Co.
MO.—Kansas City	Meyer-Blanke Co.
WISC.—Milwaukee	Reichel-Korfmann Co.
NEBR.—Omaha	Kennedy & Parsons
TENN.—Chattanooga	Southern Products Co., Inc.
Nashville	John Bouchard & Sons Co.
LA.—New Orleans	Whitman-Holloway-Olivier
TEXAS—El Paso	H. J. Baron Co.
San Antonio	Westbrook Carburetor Electrical Co.
COLO.—Denver	Chemical Sales Co.
IDAHO—Boise	Van Waters & Rogers
UTAH—Salt Lake City	Louis A. Roser Co.
WASH.—Seattle	Van Waters & Rogers
Spokane	Van Waters & Rogers
ORE.—Portland	Van Waters & Rogers

Plus warehouse stocks across the country

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Standard of the Refrigeration Industry for 70 Years

NATIONAL
REG. U.S. PAT. OFF.

CYLINDER ANHYDROUS
AMMONIA

Martocello QUALITY

OUR PRODUCTS ARE MANUFACTURED FROM THE FINEST MATERIALS AND DESIGNED TO GIVE LONGER AND MORE EFFICIENT OPERATION

compare their **QUALITY** *and* **WORKMANSHIP** *with all others and satisfy yourself that they are the very best*

COMPLETE AIR AGITATION SYSTEMS AND ICE PLANTS

"HELPFUL SUGGESTIONS"

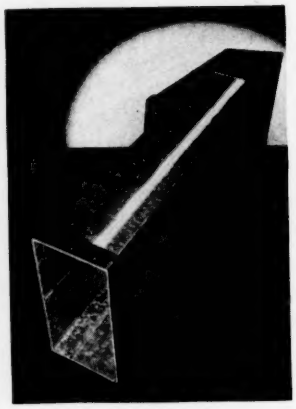
AIR LEAKS—Leaks in the Air Systems for Clear Raw Water Ice Making, annually cause thousands of tons of defective ice and usually there is no good reason for an ice plant to have but a small proportion at a time. Tighten or replace leaky fittings with bad threads. Make sure that all connections are perfectly tight when in operation. Examine by splashing water on them to see if bubles appear. If tubing or connections are broken in a Clear Raw Water Ice System, quite often, you can hear them blowing if you simply walk on the tank top. If you notice them, do not neglect to remedy it immediately.

REPRESENTED ON THE WEST COAST BY WESTERN ICE EQUIPMENT CO., 420 MARKET ST., SAN FRANCISCO, CALIF.

JOS. A. MARTOCELLO & CO.

229-231 North 13th Street **Philadelphia, 7, Pa.**

KNICKERBOCKER PRODUCTS ON DISPLAY

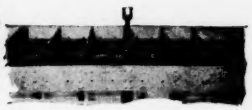


If It's An ICE CAN

KNICKERBOCKER can build it.

LARGE - SMALL; WELDED - RIVETED
HIGH PRESSURE - LOW PRESSURE
AND

MULTIPLE CAN GRIDS TO LIFT ANY NUMBER AND SIZE ICE CAN AT ONE TIME.



The ACCURATE CAN FILLER
Always the same Amount of Water and SANITARY!

FROZEN FOOD LOCKERS
Any Size Any Desired Combination of Door and Drawer Compartments

CORE FILLERS — CORE SUCKERS — BRINE TESTING KITS — FISH PANS
FISH FREEZER TRUCKS — LOCKER KEY CABINETS

"Built Stronger to last Longer"

AT YOUR SERVICE — REPRESENTATIVES EVERYWHERE

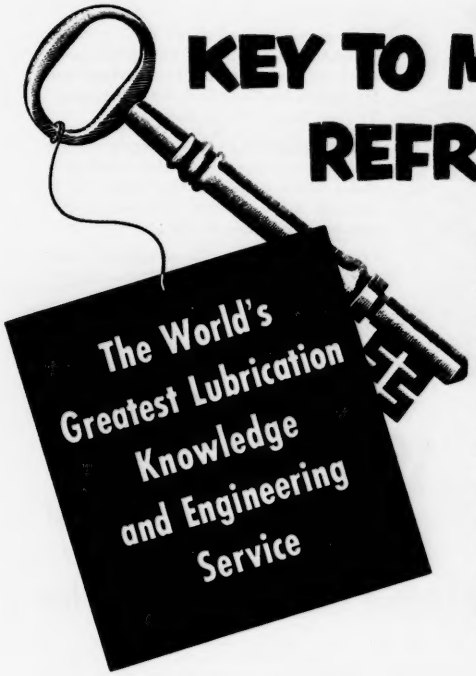
Phone: 7-5519 **Write** **Wire**

Cable Address: KNICSTACO

KNICKERBOCKER STAMPING COMPANY

Parkersburg, W. Va.

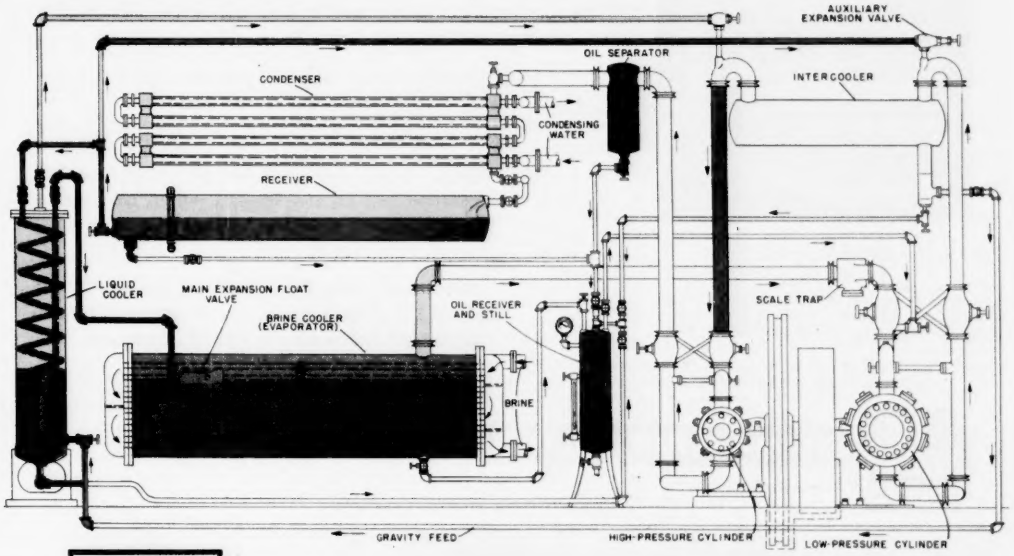
KEY TO MORE EFFICIENT REFRIGERATION!..



To get more tonnage at less cost from your refrigeration plant, the compressor oil you use must protect against wear and the formation of harmful deposits. Also, it must *not* impair heat transfer efficiency by forming films of congealed oil or gummy residues when carried over to other parts of the system.

Famous Gargoyle Arctic Oils have all these necessary characteristics. Products of 84 years of lubrication experience, these great oils are chemically stable, resist oxidation, have low pour points and are moisture-free. In thousands of plants their use has resulted in more continuous refrigeration at maximum capacity, reduced friction loss, less time and money spent on repairs and cleanings.

Enjoy all these advantages by giving *your* refrigerating compressors Correct Lubrication!



SOCONY-VACUUM
GARGOYLE
Lubricants

Socony-Vacuum
Correct Lubrication

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

You can purchase a Frigid-Vend Ice Station completely insulated and with refrigeration or, if you prefer, you can buy a Frigid-Vend Ice Station less insulation and refrigeration. You can have this work done locally.

REFRIGERATION: 1½ H.P. condensing unit with banks of vacuum cold plate evaporators (more effective than coils). Guaranteed to maintain below freezing temperature with outside temperatures of 100°.

COIN MECHANISM: Lever operated, positive delivery, rejects slugs; also returns money when machine is empty.

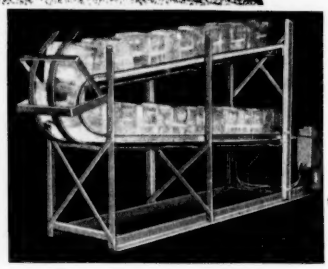
FRIGID-VEND ICE STATION

Fireproof

Vends Blocked Cubed and Sized Ice

The Station will vend four kinds of ice, two sizes of blocked ice as well as cubes or crushed ice in bags or packages. Or if you prefer you can vend any smaller combination of these four types.

Vending mechanism is positive and fool-proof. Vending lever is clutch operated, preventing breakage of handle and damage to mechanism. A customer, after insertion of money, can receive only one unit of ice at a time. Jackpot operation is impossible. Coin mechanism rejects slugs and returns money when machine is empty. In appearance, and in profitable operation, a complete Frigid-Vend Ice Station is all you could ask for.



GRAVITY ACTION DOUBLE DECK ICE BLOCK VENDORS

All steel construction with stainless steel covered tracks. ½ H. P. motor with gear head operates tripper bars during vending operation.

Capacity: 25 lb. ice blocks model—27 or 54 blocks
50 lb. ice blocks model—19 or 38 blocks

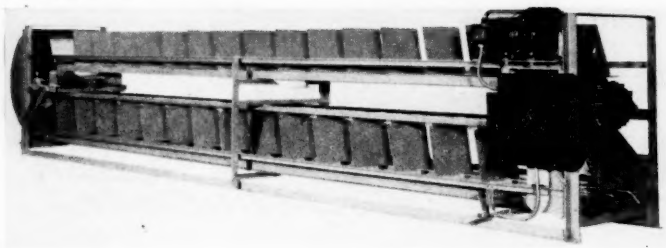
FRIGID-VEND BAG, PACKAGE AND ICE BLOCK VENDORS CAN BE PURCHASED SEPARATELY FOR INSTALLATION IN ANY ICE STORAGE ROOM.

Before You Buy, Get All the Facts. Write for information.
Prompt delivery on all Frigid-Vend Equipment.

THERMO CUBER

THERMO CUBER CO., INC.

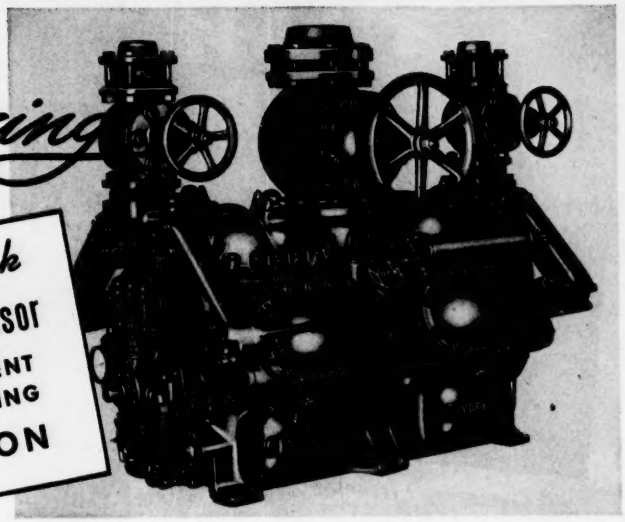
2124 NORTH SOUTHPORT AVE., CHICAGO 14



Frigid Vend
Model 2-A-15
Bag Vendor
Capacity 32 bags

Patent Pending

Announcing



The New 1950 York V/W Ammonia Compressor

FOR LOW-COST, EFFICIENT INDUSTRIAL PROCESSING REFRIGERATION

1 LOW INITIAL COST. York's seventy-five years of specialized experience and research result in manufacturing and design improvements that save money—by providing much greater capacity per square foot of floor space requirement.

2 LOW OPERATING COST. Greater speeds mean greater capacities. Flexibility of operation means lower power cost per unit of capacity. Partial capacity operation during partial load periods—with a range from 100% to about 25%—means an almost straight-line power saving!

3 LOW MAINTENANCE COST. Every part subject to wear can be readily, quickly and economically replaced with hand tools!

4 SPACE-SAVING COMPACTNESS. Multiple cylinders nested in "V/W" formation, small bore and stroke, plus increased speeds, lend themselves to compact, space-saving design and construction. The new "V/W's", in replacing old-style compressors, provide much more capacity in the same space. Costly engine room additions, or building alterations or expansions are not required.

5 SIMPLIFIED MOTORS & STARTING CONTROLS. Full, automatic unloading mechanism permits use of low torque motors, reduces current in-rush.

6 VIBRATION-FREE OPERATION. These compressors are in complete static and dynamic balance, permitting direct connection to driving motors. The result is smooth, vibration-free performance, permitting installation in remote areas . . . even on upper floors of existing buildings. Costly, heavy foundations and long, expensive refrigerant lines are eliminated.

7 FILTERED LUBRICATION. Disc-type oil filters effectively bar all dirt and abrasive matter. At the twist-of-the-wrist a filter-cleaner of turnable discs meshes tightly with filter discs, cleans all foreign matter—while machine is either operating or at rest.

8 POSITIVE LUBRICATION. An oil pump, directly connected to the crankshaft, force-feeds oil to every moving part—an unfailing supply, without chance of failure. An oil pressure gauge, and a unique, easy-to-read sight glass, permit simple, sure oil level check.

9 POSITIVE SHAFT SEAL. York's twelve-year, performance-proved Balanseal keeps crankcase gas tight-sealed. Balanseal is packless, its dual diaphragms are oil-immersed to reduce friction to a small fraction. The space within the seal is automatically kept full of oil. Balanseal always remains gas-tight.

10 BOOSTER AND HIGH-STAGE OPERATION. York "V/W's" are equally adaptable for booster or high-stage operation, providing both type machines with fully interchangeable parts. Or, when need for booster operation is over, the "V/W" machines can be changed to standard compressor operation. Greater high-temperature capacity is available for peak-load demands, and full-time use of all machines is assured.

11 COMPLETE NEW LINE. The new 1950 York V/W Ammonia Compressors are available in 4, 6, 8, 12 and 16 cylinder models. A wide, varied range with built-in flexible capacities that make them universal in application.

ATTENTION!

The new 1950 York V/W Ammonia Compressor has built-in capacities to match every industrial need, and is designed for operation with any type of prime mover—including steam turbine drive, permitting use of low pressure or waste steam. Check with your nearest York office for all the facts—and be sure to arrange to see York's new 30-minute film, *"York Offers Its Complete New Line of V/W Ammonia Compressors."*

York Corporation, York, Penna.

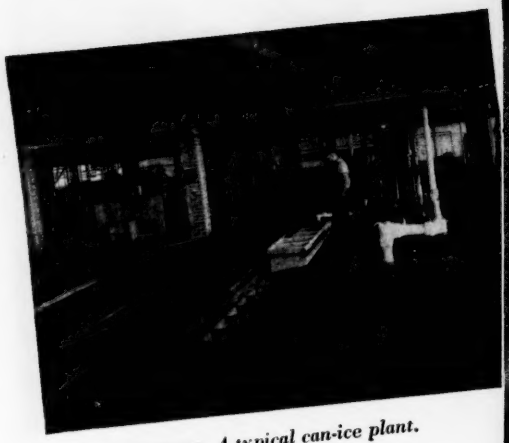
York refrigeration air conditioning

PIONEERS IN INVENTION AND DEVELOPMENT SINCE 1874

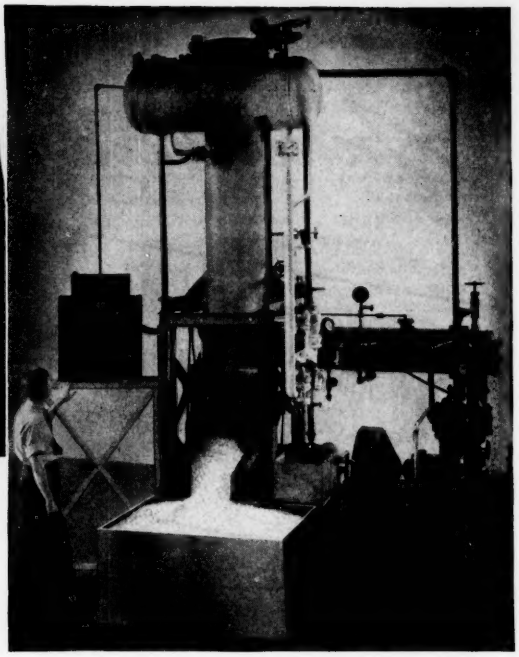
Refrigeration and Air Conditioning

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

OUR BUSINESS IS IMPROVING YOUR BUSINESS



YESTERDAY: *A typical can-ice plant.*



TODAY: *A typical Vogtice plant. It occupies only 10% of the area required by a can-ice plant of equal capacity.*

Times have changed in ICE MAKING

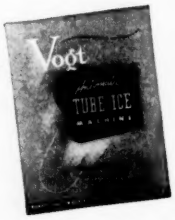
MORE Ice from LESS Plant . . . that's the story of Vogtice* and the modern Tube-Ice Machine!

Employing direct expansion of the refrigerant, the *Automatic* Tube-Ice Machine eliminates brine tanks, brine circulators, ice cans, can fillers, dip tanks, dumpers, cranes, cubers and crushers, together with the power, labor and maintenance for such equipment, common to other systems.

Yes, times have changed Mr. Ice Manufacturer . . . and it's time now to modernize with Vogtice* and avoid the high cost production methods of yesterday.

WRITE FOR BULLETIN TI-3 ⟶

A complete description of the Vogt Automatic Tube-Ice Machine, the process and the product, Vogtice, will be found in this booklet, together with applications in varied fields of food production and distribution.



*Vogtice, frozen inside tubes of small diameter, is a clear hard ice of superior quality. Either cylinder or crushed ice may be had from the same freezer by simple adjustment.

MAKE IT PAY THE VOGTICE WAY

Vogt AUTOMATIC TUBE-ICE MACHINE

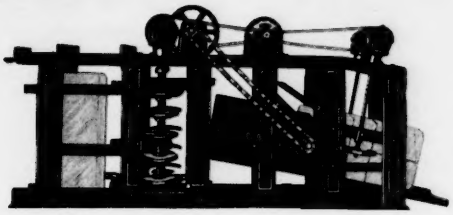
PATENT NUMBERS 2,200,424, 2,239,234, 2,396,308, 2,444,514, 2,453,140.

HENRY VOGT MACHINE CO., INC., LOUISVILLE 10, KY.

BRANCH OFFICES: NEW YORK • PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • DALLAS

A GREAT NAME *in* ICE SCORING MACHINES

The OLD RELIABLE PERFECTIONS have been known for their rugged dependability and long life for more than 28 years.

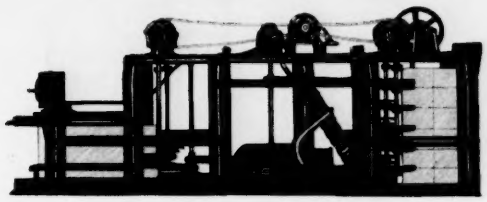


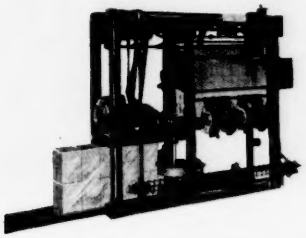
PERFECTION REGULAR

The Perfection REGULAR receives the ice block standing on end, scoring it crosswise first. Then the block enters the tilting cage which turns the block down and it slides by gravity through another set of saws that score it lengthwise. In one operation the REGULAR will score the blocks into any size pieces desired. This machine in 300 and 400 pound size, is 31 inches wide with saw guards in place, or 26 inches wide with saw guards removed. Capacity is six blocks per minute or 360 blocks per hour.

PERFECTION SPECIAL

The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.



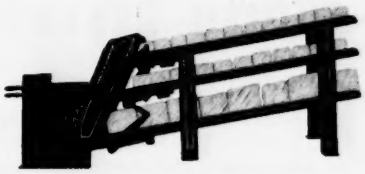


PERFECTION "MILLER"

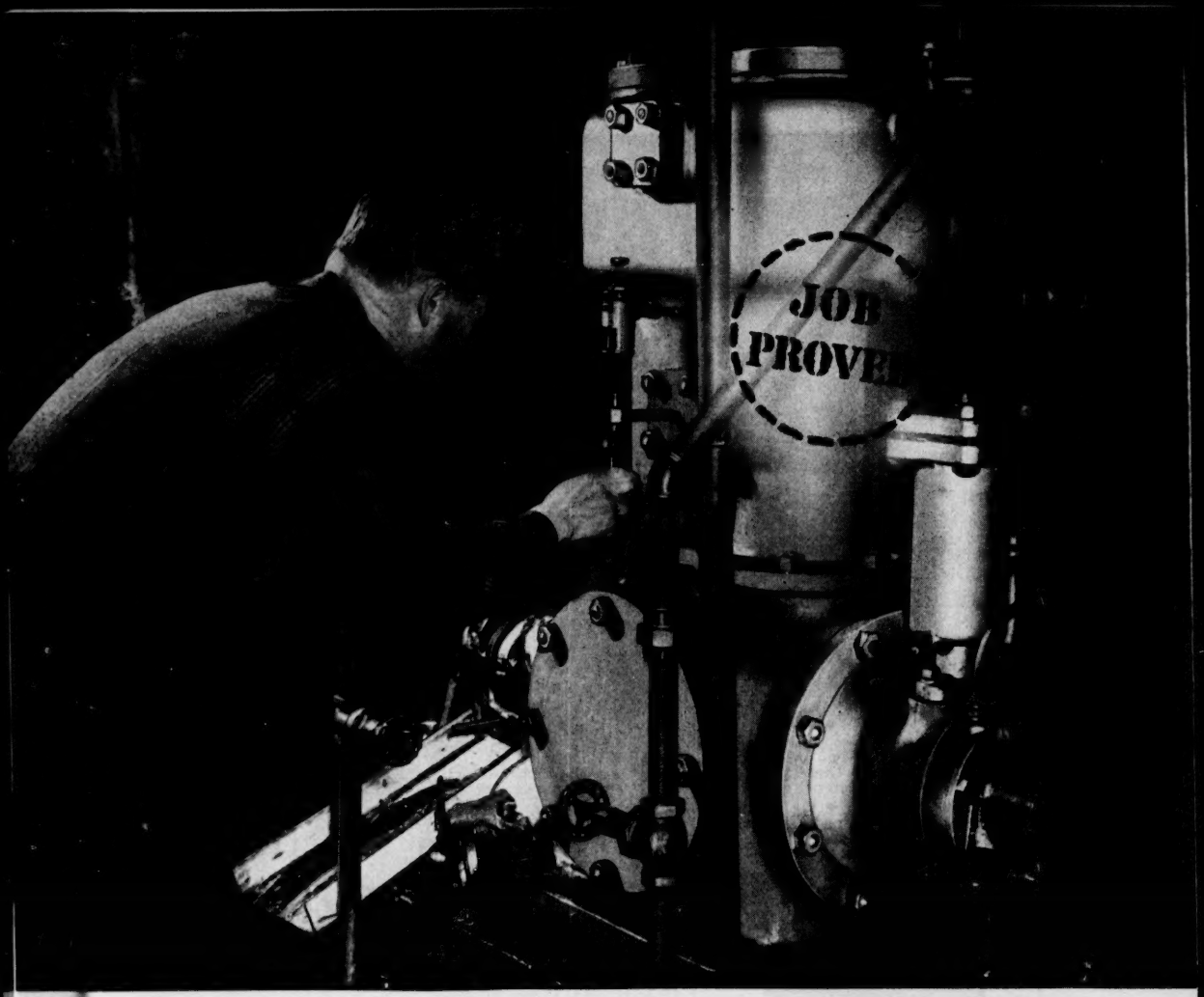
The MILLER machine receives the ice block lengthwise on edge. It is first lifted up and scored crosswise, passing the same saws again on the way down. It is then (without leaving the machine) automatically conveyed through the saws which score it lengthwise. Only one operation is necessary for complete scoring. Block is put through machine only once. The capacity is six blocks per minute, or with 300 lb. blocks, over 50 tons per hour. With 400 lb. blocks this output is increased to 65 tons per hour.

PERFECTION ICE CHUTE

A Perfection Ice Chute offers progressive ice merchandisers the surest way to give such service. Just pull a lever, out comes a cake of ice. The job is done in one-tenth of the time required under old methods. Customers are pleased. . . . Costly refrigeration is saved. . . . Business is increased. . . . Profits multiplied. The ice chute is built in two types; the straight chute, and the parallel.



Repair parts for all current models available for immediate shipments. Write for more information, or phone Fort Worth 3-1258.



SUNISO RESTORES COMPRESSOR EFFICIENCY

Hotel Turns to Suniso for Its Ice-making Equipment; Separation Troubles Eliminated, Oil Costs Cut 20%

A hotel using a 15-ton ammonia compressor in making ice had constant trouble with the oil in the splash and force-feed systems. It discolored badly and failed to separate properly from the refrigerant. Furthermore, excessive amounts of oil carried over into the separators, lowering the efficiency of the entire system.

After consulting a Sun representative, the hotel switched to a "Job Proved" Suniso Oil, and has been using it for over three years with complete satisfaction. It maintains its color, separates properly from the refrigerant, and has reduced oil consumption 20 percent. As a result the hotel has adopted Suniso to lubricate the splash system of its two-ton ammonia compressor as well.

It is performance such as this that has made Suniso Oils the predominant choice of original equipment manufacturers. Available in six different grades, Suniso Oils have exceptionally low pour and wax separation points. They have high dielectric strength and unusual resistance to chemical change when mixed with Freon or other modern refrigerants. For a copy of the 52-page illustrated bulletin "Lubrication of Refrigeration and Air-Conditioning Equipment" write Department JR2.

SUN OIL COMPANY · *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUNISO REFRIGERATION OILS

"JOB PROVED" THROUGHOUT THE INDUSTRY

SUNOCO

ICE AND Refrigeration

J. F. NICKERSON, Founder

Published First of Each Month by

NICKERSON & COLLINS CO.
433 N. Waller Ave., Chicago 44, Ill.

H. T. McDermott, Pres., H. T. Curtis, Vice-Pres.,
L. R. Townsley, Sec.-Treas.

●

H. T. McDERMOTT
Editor and Publisher

EDGAR R. CURRY, Managing Editor

EMERSON A. BRANDT, Technical Editor

HARRY D. BUSBY, Associate Editor

●

L. R. TOWNSLEY, General Mgr.
HELEN G. SMITH, Asst. Mgr.
R. L. HENDRICKSON, Adv. Mgr.

Advertising Representatives

EDW. DAVIESON, Chicago
D. WANAMAKER, Los Angeles
A. M. WILLCOX, New York

●

GENERAL OFFICE: 433-435 N. Waller Ave.
Chicago 44, Ill.

EASTERN: New York: Telephone LExington 2-4735

LOS ANGELES: Duane Wanamaker
610 S. Broadway, Los Angeles 15, Calif.

WASHINGTON: 1706 L St., N.W.
Washington 6, D. C.

CHANGE OF ADDRESS

Notify publisher and your local post office promptly of change of mailing address to avoid non-receipt of copies. Copies incorrectly addressed, because of failure to notify publisher, cannot be replaced. Upon request, post office will provide, without cost, convenient "change of address" mailing cards.

SUBSCRIPTION RATES: United States and Possessions, $3.00 a year; All Other Countries, $4.00 a year.

Single copies, 35 cents. Remittances must be made by postoffice or express money orders, international money orders, checks or drafts on Chicago or New York, payable to NICKERSON & COLLINS CO.

Copyright, 1948, by Nickerson & Collins Co.—The entire contents of this journal are covered by general copyright, and special permission must be obtained from the publishers of same before reprinting long extracts or reproducing illustrations; but editors desiring to do so are welcome to use not more than one-third of an article, providing credit is given at the beginning or end of such excerpts as follows—from "ICE AND REFRIGERATION," Chicago.

Entered as second class matter at Chicago, Ill., August 8, 1891, under the act of March 3, 1879. Additional entry at Beloit, Wis., April 20, 1948.

Ice and Refrigeration is indexed regularly by Engineering Index, Inc., and is microfilmed for library use by University Microfilms.

CONTENTS

Vol. 118 FEBRUARY, 1950 No. 2

A MONTHLY REVIEW OF
THE REFRIGERATING INDUSTRIES

Syrup Treatment of Apple Slices for Freezing Preservation 17

A Practical Solution to Accurate Refrigeration Storage Costs (illus) (Part IV) *D. O. Haynes* and *James W. Straub* 19

Court Decisions. *Leo T. Parker* 25

New Mechanical System for Refrigerator Cars Maintains Even Temperatures 28

The Ice Industry 29

Cooling with Ice Enhances Quality and Value of Produce Grown for Local Use 29

Sweet Corn Icing Developed by Research Pays Dividends to Indiana Farmers (illus) 23

News Coverage at Ice Convention 34

Association Reports 36

The National Association Practical Refrigerating Engineers 39

Practical Aspects of Food Freezing. *A. R. Carlson* 39

Question Box 41

Member Activities 42

Notes on Engineering and Equipment in Great Britain. *W. R. Woolrich* 46

Refrigerated Warehousing Industry 49

Promotional Pieces Keep NARW Members and Customers Informed (illus) 50

Refrigeration Research Foundation Rounds Up Active Research Projects 51

Review of Refrigerated Warehousing 52

Cold Storage Holdings 53

Frozen Food Concern Improves Facilities with New Refrigerated Storage Space 55

Utah Ice & Storage Replaces Building Destroyed in Costly Fire (illus) 57

Frozen Foods 60

Railroads Expect Increase in Frozen Food Shipments 60

Low Temperature Research Laboratory Achieves Lowest Temperature 61

New Plants and Improvements 68

Obituary 70

New and Improved Equipment 72

Manufacturers News 76

Catalogs and Bulletins 78

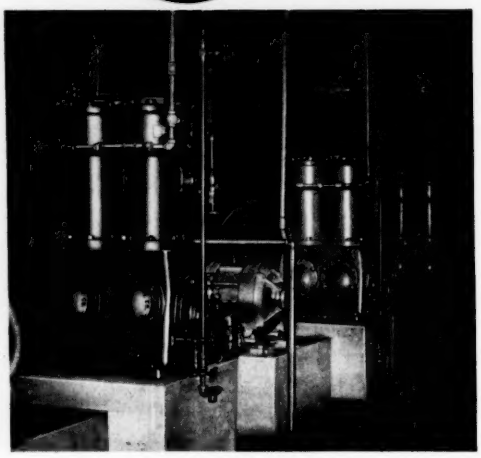
ADVERTISERS INDEX 88

BUYERS GUIDE 80

HERE'S HOWE

SHELL AND TUBE CONDENSERS • Install Now!

(REMOVABLE TUBE DESIGN)



Three 20-ton Howe Compressors

YOU SAVE money, space, labor, time, with Howe individually engineered installations, large or small. You get that constant exact temperature and humidity control which in thousands of plants is keeping products at top quality. Howe Shell and Tube Condensers can be compactly grouped in batteries for multiple installations, for any capacity plant. Both shell and tube and shell and coil types for Freon.

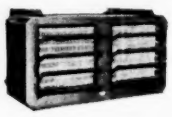
OUTSTANDING FEATURES • RETUBING — without special tools • RETUBING — without experienced mechanics • TUBES — standard material purchasable in any locality.

HOWE EVAPORATIVE CONDENSERS save 95% on water, as well as space. Ideal for restricted water areas.

GET THE BENEFITS of Howe's 38 years of practical, test-proved refrigeration knowledge and their ruggedly built, trouble-free equipment. Write for free booklet, or without obligation consult Howe engineers on your specific problems.

SINCE 1912, BUILDERS *exclusively of refrigeration equipment: Ammonia compressors, standard, multiple effect and boosters, 2 to 150 tons; self-contained automatic ammonia units; Freon condensing units; shell and tube condensers; brine and water coolers; unit coolers; fin coils; locker freezing units; air conditioning (cooling) equipment.*

A few territories still open . . . write for details about the HOWE profit-plan for new distributors.

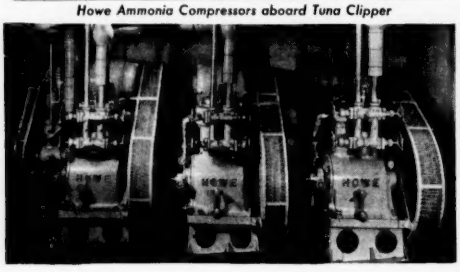


Howe-Conditionaire Unit Coolers

Ceiling Type

A size for every cooler and temperature application. Single and double fan models, for operation with ammonia, Freon or brine. Special Rapid Freeze models with automatic defrost for low temperature storage or processing.

Howe Ammonia Compressors aboard Tuna Clipper



HOWE

IN THIS ISSUE —

Syrup Treatment of Apple Slices

A circular has been issued by the Regional Research Laboratory of Albany, Calif., on a new prefreezing treatment for apple slices called "syrup filling." This process, it is claimed, yields a product with more desirable texture and flavor and less drip than the usual commercial methods. The circular is summarized on page 17.

Refrigerated Storage Costs

The final article in the series by Haynes and Straub ties all the data together and shows how to determine unit costs applied to square foot of floor area—page 19. Then it proceeds to the determination of costs on the basis of the tariff unit for both holding and receiving and holding. A comparison of costs on the basis of 100 pounds of different commodities is interesting. With all the material from the four articles now available it is possible to apply the methods described to specific plants and operations.

Court Decisions

A review of leading and higher court decisions is presented in the article starting on page 25, concerned chiefly with legal points that are unusual and covering border line cases. These are presented here with the thought that they may enable readers to avoid expensive law suits involving their business and to prepare them to win unavoidable suits of that nature.

New Mechanical Refrigerator Car

A new system for mechanical refrigeration of railway cars carrying perishable goods that will maintain automatically any temperature from minus 20 to 60 F. is announced in the article on page 28. It is an adaptation of refrigeration units that have been used successfully on trucks and trailers.

Hydrocooling Vegetables for Local Use

A bulletin issued by the Research and Engineering Department of the National Ice Association covers the advantages of hydrocooling of fresh produce for local marketing. This is a subject which will be of increasing interest to growers and distributors of fresh produce as well as to ice men and consumers, since it enhances the quality and value of the produce and furnishes a ready-made market for ice. See page 29.

Selling Ice to Mechanical Owners

A survey conducted by the National Association of Ice Industries on the extent to which mechanical refrigerator owners buy ice turned up some very interesting information. A paper was presented at the recent National Ice Convention summarizing this information, from which the article on page 35 was prepared.

Food Freezing Plant Details

At the recent N A P R E Convention, the attendants were much impressed by the detailed and helpful information given on food freezing plants by A. R. Carlson. The paper is printed on page 39. It describes several phases of the problem which may be overlooked. In addition it gives many design and operating factors obtained from experience which will aid the operator or engineer to avoid the pitfalls which many times occur in a purely theoretical analysis.

The British Way

While Dean W. R. Woolrich was serving as scientist in our British Embassy he had an excellent opportunity to observe the engineering and mechanical developments in that country. A keen observer, he gives an interesting description of many phases of life in Britain. The article on page 46 also shows how we in the United States are pictured to those in other countries in ways and through media which do not give a true perspective of our country.

Research Projects

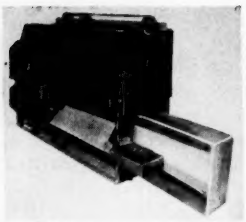
A list of 21 active research projects now being sponsored by the Refrigeration Research Foundation has been issued, with number and title of project, where it is being carried on and name of leader. The list, in tabular form, is published on page 51.

New Frozen Food Warehouse

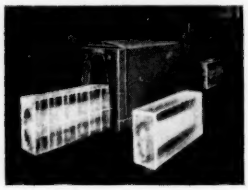
The Birds Eye-Snider Division of General Foods Corp., occupies new refrigerated storage facilities at Watertown, Mass., enabling the handling of more volume and providing of better and faster service. For description and pictures see page 55.

Utah Plant Rebuilt

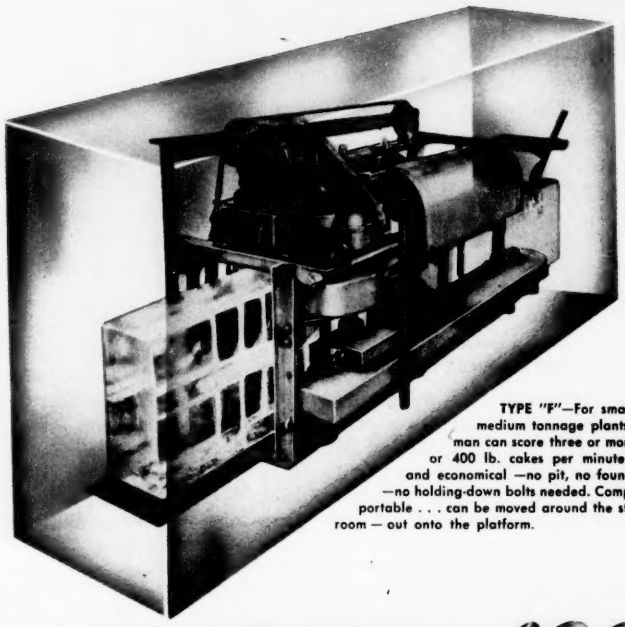
Two modern warehouses have been completed by the Utah Ice & Storage Co., Salt Lake City, Utah on the site of a disastrous fire which destroyed a three-story storage annex last June. For description and pictures of the new construction see page 57.



TYPE "G"—The scoring machine the industry has been waiting for — a simple streamlined, compact, safe, automatic machine at a medium price. Semi-portable; requires no pit. A turn of the starting lever starts each scoring cycle — and it is automatically completed.



TYPE "UM"—A precision-built, fully automatic machine that accurately scores at the rate of 6 cakes (300 or 400 lb.) per minute. Feed and discharge conveyors are built integral with the scorer for straight-line operation.



TYPE "F"—For small and medium tonnage plants. One man can score three or more 300 or 400 lb. cakes per minute. Safe and economical —no pit, no foundation —no holding-down bolts needed. Completely portable . . . can be moved around the storage room — out onto the platform.

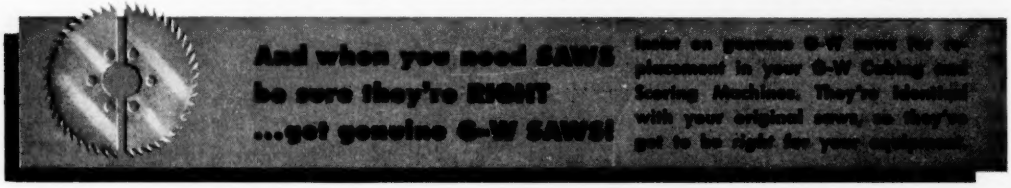
Clean, even scoring builds business -- WHEN YOU SCORE ICE USE G-W MACHINES

Users of G-W Type "F" Scoring Machines know their clean, even-scoring operation . . . how their economy in ice scoring will build up their business, reduce delivery costs. They know, too, all about their economical maintenance because they are "built to last." Says one user: "Our Type 'F' Scorer has been in constant use for nearly 14 years and has required very few repairs. It's given the best service of any piece of equipment we have bought since we started in business in 1906."

And now the new Type "G" brings automatic scoring to a medium priced unit! More rugged than the Type "F" and as precision-built as the Type "UM" — the new Type "G" Scorer is priced within the reach of every ice plant.

Type "UM" combines scoring with handling through its straight-line feeder and discharge conveyor.

Any of these G-W Scoring Machines will meet your plant conditions of tonnage and size requirements. Get in touch with a G-W engineer today — and SCORE ICE faster . . . easier . . . cheaper.



G-W ICE TOOLS — A complete line of top-quality hand-tools . . . tongs, hooks, shavers, bars, chisels, etc. . . . designed to make manual handling of ice easy and safe—made tough to stand the gaff for years. Write for Bulletin No. 480.

5882

GIFFORD-WOOD CO.

NEW YORK 17 *Since 1814* CHICAGO 6
420 LEXINGTON AVE. *Hudson, N. Y.* 565 W. WASHINGTON ST.
Pacific Coast Representative
WESTERN ICE EQUIPMENT COMPANY 420 Market St., San Francisco 11, Calif.

UP-ENDER • CUBER • SIZER • BREAKER-ELEVATOR • TIERING MACHINE • CONVEYOR • BREAKER

Syrup Treatment of Apple Slices For Freezing Preservation

A CIRCULAR has been issued by the Western Regional Research Laboratory, Albany, Calif., on a new prefreezing treatment, called "syrup filling," for apple slices preserved by freezing. This method, which has been developed on a laboratory scale, yields a product with more desirable flavor and texture and less drip than are commonly obtained with commercially used methods for the prevention of browning of apple slices.

Syrup filling consists of removal of tissue gases from apple slices by the use of a vacuum, followed by partial replacement of voids with a sugar syrup containing about 40 per cent sucrose and a small amount of antioxidant. The operation is carried out by immersing sliced apples in the syrup in a vacuum chamber, pulling a vacuum of about 29 inches of mercury for 4 to 5 minutes, releasing the vacuum with air, and allowing the syrup to penetrate the slices for a few minutes. The slices are then removed, drained, packaged, and frozen in the usual manner.

The greatest overall improvement in texture due to syrup filling is observed in soft varieties of apples such as Gravenstein, McIntosh, Cortland, and Rome Beauty; the texture of Winesaps and Newtown Pippins is not helped much, since their hard structure is not seriously weakened by the presently used steam blanching or sulfiting processes. However, the flavor of syrup-filled slices is distinctly better than that of comparable slices blanched in steam. In addition, slices impregnated with syrup containing 40 per cent sucrose lose only one-third to one-half as much juice during thawing as comparable sulfited slices. A large reduction in the amount of undesirable frothing and "boiling over" frequently observed when sulfited slices of soft varieties are baked in pies is also obtained.

In this circular, the general equipment and procedure for syrup filling is discussed, followed by sections on (1) the sucrose concentration of the syrup; (2) the prevention of browning with antioxidants; (3) changes in weight and sugar content of the apple slices; (4) changes in the syrup; (5) alternate procedures, including (a) breaking the vacuum with syrup instead of air and (b) a "continuous" procedure, consisting of dipping slices in syrup, followed by sealing the syrup-coated slices in cans under a vacuum; and (6) addition of calcium salts or fruit acid to the syrup.

Equipment and Procedure for Batch Treatment

The following information on syrup filling is based upon laboratory experiments with batch sizes up to a maximum of about 25 pounds of apple slices. Application of the method to large-scale operations will require preparatory testing.

Up to and including slicing of the peeled and cored apples, the equipment and procedure required are identical with those of the usual apple freezing line. In addition to such a line, a vacuum chamber and attached vacuum source capable of maintaining a vacuum of 29 inches of mercury (or 25 to 26 inches if a holding time of 15 minutes is used) are required, as well as accessory equipment such as syrup tanks, baskets, etc.

There are many satisfactory methods of carrying out the vacuum operation, and since it is frequently possible to convert presently available plant equipment to such an operation, this circular does not attempt to make specific recommendations on equipment to be used. However, satisfactory results have been obtained with a 50-gallon stainless-steel vacuum tank as the vacuum chamber.

With this equipment, the prepared slices are removed from the holding salt solution (1 to 2 per cent), drained, filled into a perforated stainless-steel basket, and weighted down with some sort of cover to prevent slices from floating in the syrup. Next the filled basket is lowered into the vacuum tank containing sufficient syrup to cover the slices completely. Sufficient clearance (6 to 8 inches is generally sufficient) between the syrup level and the vacuum outlet is provided to allow for frothing during the evacuation. After the container has been closed, the vacuum source is turned on and the vacuum brought down to and held at 29 inches of mercury for 4 to 5 minutes, or at least 15 minutes at 25 to 26 inches. The vacuum is then released with air, and the slices are held undisturbed for a few minutes to permit penetration of the syrup. Then the slices are removed, drained briefly, packaged, and frozen in the usual manner.

If possible, sight ports should be built into the vacuum vessel, so that the progress of the gas removal can be followed by the intensity of bubbling. The evacuation should be continued until no substantial amount of action is visible.

If a corrosion-resistant vacuum chamber is not available, it is possible to use a slightly modified procedure. The slices and syrup are placed in an ordinary stainless-steel container with draining spigots, and this container is hoisted into the vacuum chamber.

Grab and Haynes[1] have recently described the conversion of steam-pressure canning retorts for use as vacuum vessels. In any case where converted equipment is to be used, the plant operator should, of course, assure himself that the reaction chamber is capable of withstanding the required vacuum. Vacuum treatment of fruit products has been included in certain patented processes, and any packer contemplating the use of a vacuum process should familiarize himself with these patents.

Sucrose Concentration in the Syrup

The best-quality product is obtained with syrups containing 40 to 60 per cent sucrose, and no particular advantage has been found for concentrations over 40 per cent. Slices filled with 20 per cent syrup result in a much less desirable product.

Prevention of Browning with Antioxidants

Browning during freezing, thawing, and baking of the slices is satisfactorily controlled by adding small amounts of either sodium bisulfite or ascorbic acid to the syrups. A concentration of 200 to 300 ppm. of sulfur dioxide or 0.2 to 0.3 per cent ascorbic acid is generally sufficient. The best results with ascorbic acid are obtained when it is used in conjunction with supplements such as 0.2 to 0.3 per cent salt or 0.5 to 1.0 per cent citric acid. If the final intended use for the frozen product permits packing and freezing of the slices submerged in syrup, the effect of the ascorbic acid will be greatly enhanced.

1. See Literature Cited.

Changes in the Apple Slices

Most apple varieties impregnated with 40 per cent syrup gain 3 to 8 per cent in weight and increase in apparent sugar content (determined by refractometer) from original values of 9 to 14 per cent sugar to final values of 17 to 20 per cent sugar. The final weight and sugar content of slices will depend, of course, upon such factors as variety, maturity, contact time, etc. Within a given variety, soft, ripe fruit absorbs more syrup than hard, immature fruit.

Extended immersion in syrup may result in removal of considerable water from the apple slices by osmotic action. In certain varieties which permit only minor syrup absorption, this osmotic action may be sufficient to result in an overall weight loss, even though the slices have picked up sugar from the syrup.

Changes in the Syrup

Changes in the syrup will also depend upon such factors as variety and maturity of the apples, contact time, etc., and each new lot of apples should be subjected to preliminary small-scale tests to determine how it will behave during the treatment.

In general, however, when apple slices and syrup are mixed, the most pronounced change in the syrup is a lowering in density, the extent of which depends on the ratio of fruit to syrup and on the contact time. Of course, if freshly prepared slices from the holding salt solution are not thoroughly drained, a serious dilution effect will also result. With a 1:1 ratio by weight of slices to syrup, the sucrose content of the syrup will usually decrease by about 10 per cent after one batch of apples has been treated. Hence it will be necessary to check the sucrose content of the bath frequently in order to keep it at the desired level. The concentration of antioxidant will also decrease and should be checked frequently for control purposes.

The volume of the syrup will generally maintain itself pretty well, as the increase caused by the addition of make-up sugar will balance the decrease caused by absorption of sugar by the slices. With varieties of apples that permit little syrup absorption, or with contact times that are unusually long, or with inadequate drainage of the holding salt solution from the apples, the volume of syrup will increase, and a reduction in volume by an evaporation process may become necessary.

Breaking Vacuum with Syrup

The process described above may be modified slightly by evacuation of apple slices in the absence of syrup, followed by addition of the syrup to the evacuated slices at the time the vacuum is broken. This procedure aids removal of gases from the apple tissue, eliminates the frothing problem, and reduces the contact time between apples and syrup (thereby reducing the amount of water drawn out of the apple slices by the osmotic action of the syrup). This method requires a slight modification of the equipment described earlier, so that syrup instead of air can be admitted at the time the vacuum is broken. Connecting a supplementary vessel containing the syrup d i r e c t l y to the evacuation chamber will accomplish this purpose. The existing pressure difference forces the syrup into the vacuum vessel.

Alternative Procedure for Continuous Operation

To avoid some of the obvious disadvantages of batch processes, a more basic modification of the syrup-filling technique can be made, which will permit operation in a more nearly continuous manner. The freshly prepared apple slices are dipped directly into a tank containing syrup, drained, placed in cans, and sealed under a vacuum of 29 inches of mercury prior to freezing. Ribbed cans capable of withstanding such a vacuum must be used.

The success of this procedure is entirely dependent upon the ability of the container to maintain a vacuum throughout the storage period. If the container leaks or is opened prior to defrosting, oxygen will re-enter the tissue and rapid browning will occur throughout the interior of the slices during thawing.

Addition of Calcium Salts or Fruit Acid

If desired, additional firmness of the apple slices can generally be obtained (depending upon maturity and storage history) by addition of small amounts of calcium salts to the impregnating solution (2, 3). Similarly, the final acidity of syrup-filled fruit can be adjusted by incorporating the proper amount of fruit acid in the syrup. The addition of 1.5 to 2.0 per cent of citric acid to the syrup used to fill Delicious apples results in marked improvement in flavor.

Requirements of governmental regulatory agencies must, of course, be met if calcium or acid is to be added to the product.

Literature Cited

1. Grab, E. G., Jr., and Haynes, D., Quick Frozen Foods, 10:11, 71 (1948).
2. Hills, C. H., Nevin, C. A., and Heller, M. E., Fruit Prod. Jour. and Amer. Food Mfr., 26:356 (1947).
3. Powers, J. J., and Esselen, W. B., Fruit Prod. Jour. and Amer. Food Mfr., 25:200 (1946).

USDA Announces Export Payments for Apples and Pears

THE U. S. Department of Agriculture has announced an export payment program, designed to stimulate exports of apples and winter pears. Payments will approximate 50 per cent of the export sales price, f.a.s. U.S. port, but not more than $1.25 per container of approximately one bushel, to eligible U.S. exporters who export fresh apples and winter pears of specified grades to countries participating in the European Recovery Program; Israel; Egypt; the Philippine Islands; and western hemisphere countries, except Canada, Cuba, Mexico, and Venezuela.

Apples produced anywhere in the United States will be eligible for export under this program, but winter pears will be limited to Anjou, Bosc, Comice, and Winter Nelis varieties produced in Washington, Oregon, and California.

The program was developed under authority of Section 32, Public Law 320, 74th Congress, to use a part of the annual customs receipts to encourage the export of agricultural commodities through such payments. Purpose of the program is to aid in the re-establishment of foreign outlets for American apples and pears, and to assist in the removal from domestic channels of commerce those apples and pears which ordinarily were exported prior to the war.

Details of the program, including information on the filing of applications by exporters desiring to participate in the program, will be available shortly.

The 1949 apple crop is 132.1 million bushels, compared with the 88 million bushel crop of 1948 and the 1938-47 average of 111 million bushels. The 1949 supplies of winter pears are estimated at about one-fourth above both last year and the average. Prewar exports averaged approximately 8 per cent of the apple production and nearly 40 per cent of the winter pear production.

A Practical Solution to Accurate Refrigeration Storage Costs

Part IV
The Final Steps In Developing Individual Commodity Storage Costs

By

D. O. Haynes
Consulting Industrial Engineer
New York City

and

James W. Straub
Comptroller Merchants Refrigerating Co.
New York City

THE engineering phase of our cost-finding work has been completed. In the first Part of this series we covered the methods used in developing dead load losses in a plant; in the next Part commodity loads were discussed in detail and in the third, the tons of refrigeration required in each section of the house were calculated and the power bills distributed.

It now remains to use the figures which have been gathered to arrive at unit storage and refrigeration costs in order to calculate for each commodity a unit cost which will reflect all elements, including the refrigeration expense involved in storing it. When we have done this, we shall then close this series with a brief discussion of how the resulting figures can be used for rate-making or comparison purposes and as a basis for standard commodity storage costs.

The final phase of our work is largely a matter of so organizing the figures which have thus far developed from the month's operations that the desired end-figures can be completed with a minimum of time and effort. Form 7 has been designed for this purpose. It serves two functions. The upper part is a voucher for distributing various expenses and the two lower sections are used as a work sheet for calculating the all-important unit storage and refrigeration costs which will, in turn, be applied to each commodity in arriving at our final objective—individual commodity unit storage costs.

Each column in this form has been given a letter and where the figures in any column are calculated by using one or more figures from other columns the mathematical formula is given in terms of the letters of the columns from which the figures are taken. Thus, the figures in Column D are the sums of the figures in Columns A, B and C.

One of the assumptions made when we started our search for costs in our hypothetical warehouse was that the company operating it kept accounting records on a standard cost basis. This assumption should be modified slightly by saying that all expenses are on a budgeted basis except the cost of power. The reason for this exception is that the cost of power fluctuates more from season to season than any other refrigeration expense. If we were to work up commodity costs based on an estimated annual expense spread equally over each month of the year we would derive figures which would penalize those products which are habitually stored in the colder months and lighten the cost of those which come in during the times of the year when outside temperatures are high. Because of this dominating influence of power expense in refrigeration costs we use the actual power-bill cost for each month. We shall find later that it is possible, after unit costs have been developed over a period of at least a year, to handle unit storage costs on a budgeted basis—but this cannot be done successfully unless these costs have been found for each month according to the procedure outlined here.

Before taking up Form 7 and its use in detail it should be made clear that although budgeted costs are usually referred to as standard costs there is no standard method for setting up this type of accounting. One firm may want to budget its costs on the basis of volume and use for each month the amounts budgeted for the current volume. This is, of course, carrying flexible budgeting to a very fine method of application. Another concern may prefer to use estimated expenses (again based on volume) for three-, six-, or twelve-month periods. When this method is used non-fluctuating costs are employed throughout the selected period. It is beyond the scope of this series to cover the techniques of standard costs in detail, but it is felt necessary to make this brief observation lest those unfamiliar with this type of accounting procedure receive the impression that the term standard costs implies standardization of method. For the sake of simplicity, we shall assume in the present instance that the budgeted figures have been set up for the current year and hence that one-twelfth of the annual budget is the amount used each month as the standard cost for each budgeted expense item.

Part IV—Final

In this concluding article the methods previously explained and the charts and data presented are brought together and utilized to determine commodity storage cost on a unit basis. Detailed examples of these calculations are given and then the uses of the various factors are summarized.

The series began in November and the subject matter presented in earlier articles was:

Part I—Space Calculations and Unrefrigerated Space Cost

Part II—Heat Losses: Receiving, Freezing, Holding

Part III—Refrigeration Tonnage and Power Expenses

The figures used in Columns A, B and C of Form 7 have been taken from the company's budget for the year in question and are, therefore, the same for each month of the year. The company's Chart of Accounts carries, among others, two controlling accounts: E 3200—Storage Expenses and E 3300—Refrigeration Expenses. Each of these controlling accounts is the sum total of all the individual items comprising these two general classes of expense. The voucher at the top of Form 7 relieves (credits) the two controlling accounts with the budgeted amounts indicated and charges them to C 020—Cost of Storage Sales. Since the actual power bills for the month were charged off through the voucher part of Form 6 they are not charged to any account from Form 7. These two vouchers complete the

MONTHLY STORAGE & REFRIGERATION COST VOUCHER & UNIT COST CALCULATION SHEET

WAREHOUSE DIV. _____ KEY _____ MONTH _____

	SPACE COST INCLUDING DEP'N OF INSULATION & PIPE A	COST OF DEP'N REF'G'N MACHINERY B	PROPORTION OF REF'G'N O-H C	TOTAL BUDGETED SPACE COST (D)=A+B+C	PROPORTION OF POWER & LIGHT E'	TOTAL REFRIGERATION COST (E)=B+C+E'
STORAGE O-H	16,250 00			16,250 00		
COOLERS	270 00	105 00	1,050 00	1,425 00	326 95	1,481 95
FREEZERS	530 00	320 00	2,100 00	2,950 00	803 69	3,223 69
SHARP FREEZER	80 00	8 80	350 00	438 80	112 24	471 04
TOTAL	17,130 00	433 80	3,500 00	21,063 80	1,242 88	5,176 68
	CR. E 3200	CR. E 3300		DR. C020		

COST OF UNREFRIGERATED SPACE INSULATION & PIPING COST INCLUDED

	STORAGE SPACE		
	NUMBER OF SQ. FT. F	COST/SQ.FT. A/F G	SPACE COST PER SQ.FT. G(OH)+G'(H)
OVERHEAD	123,400	13.17 ¢	
COOLER	64,900	.42	13.59 ¢
FREEZER	52,600	1.01	14.18
SHARP FREEZER	5,900	1.36	14.53

ACCOUNT SYMBOLS AND NAMES

E3200 STORAGE EXPENSE

E3300 REFRIGERATION EXPENSE

C 020 COST OF STORAGE SALES

COST PER TON OF REFRIGERATION & COST PER SQ. FT. OF REFRIGERATED SPACE

	TONS OF REF'G'N			COST/TON	REF'G'N COST DIST'N		COST PER SQ. FT.	
	SPACE P	COMM. Q	TOTAL P+Q R	E/R S	SPACE P x S T	COMMODITY S x Q	REF'G'N T/F U	TOTAL H+U
COOLER	383	410	793	$1.8688	$ 715.75	$ 766.20	1.10 ¢	14.69 ¢
FREEZER	649	773	1422	2.2670	1,471.28	1,752.40	2.80	16.98
SHARP FR.	77	92	169	2.7872	214.62	256.42	3.64	18.17

SOURCES OF ENTRIES AND BASIS OF DISTRIBUTION

A - SPACE COST INCLUDING DEPRECIATION OF INSULATION AND PIPING:
FROM BUDGET FIGURES PREPARED FOR THE PERIOD.

B - COST OF DEPRECIATION OF REFRIGERATING MACHINERY:
DISTRIBUTED ON BASIS OF ESTIMATED PEAK LOADS FOR YEAR IN COOLERS, FREEZERS AND SHARP FREEZERS.

C - PROPORTION OF REFRIGERATION OVERHEAD:
BUDGETED AMOUNT OF REFRIGERATION OVERHEAD FOR PERIOD DISTRIBUTED ON BASIS OF PEAK LOADS, AS IN "B".

PROPORTION OF POWER & LIGHT:
FIGURES TAKEN FROM POWER EXPENSE DISTRIBUTION VOUCHER, HENCE NO CHARGES MADE FROM THIS RECORD.

PREPARED BY _____

DATE _____

Form 7—Work sheet and voucher utilized to determine refrigeration and other costs on the square foot basis as well as refrigeration charges to the different classes of space.

general accounting aspects of our work and the books of the company reflect all the month's expenses for storage operations. The data from the power bills is repeated here because they are needed in arriving at unit costs—a purely mathematical procedure which we can now ready to undertake.

Observe that in working up the voucher part of Form 7 we have separated the costs for each class of storage space so that we can arrive at the unit cost for each class of space as has been done in the middle portion of Form 7. Note particularly that the storage cost per square foot is made up of two elements. The first is the Storage Overhead cost per square foot and is calculated by dividing the amount of this expense shown in Column A by the total number of refrigerated square feet in the plant. Each class of space carries this uniform overhead expense (13.17 cents per square foot). To this figure is then added the cost of depreciation of insulation and piping for each class of space. Thus, the cost of cooler space is 13.17c for storage overhead and .42c for depreciation or the total cost per square foot of unrefrigerated space in coolers is 13.59c. When the corresponding figures are worked up for freezers and sharp freezers we have three basic figures. It now remains to add the cost of refrigeration for each class of space to convert the unrefrigerated unit cost to the cost of refrigerated space.

The lower portion of Form 7 is used as a work sheet for collecting all the information needed for this purpose. The Tons of Refrigeration shown under Space (Column P) and Commodity (Column Q) were taken from Form 6. The Total Cost of Refrigeration for each kind of space (Column E) is divided by the corresponding tonnage requirement (Column R) to arrive at the cost per ton in Column S.

The distribution of the refrigeration cost to space and commodity is accomplished by applying the cost per ton to the respective tonnage requirements as indicated in the Columns headed Space and Commodity. These figures can be quickly checked because the total of these two columns must equal the total of the costs shown in Column E. Thus, for the Coolers, $715.75 plus $766.20 equals $1481.95.

The refrigeration cost per square foot, calculated as shown in Column U, when added to the non-refrigerated cost per square foot (Column H) gives us the final figure for each kind of space—14.69 cents for coolers, 16.98 cents for freezers and 18.17 cents for sharp freezers. These figures, together with the cost per ton of refrigeration for each class of space are the basic data needed for developing individual commodity storage costs.

Before we tackle this final phase of our cost work a short comment on the question of pile data is in order. The methods used by Merchants Refrigerating Company in compiling this information differs from those advocated in "Standardization as a Basis for Rates." The philosophy underlying the practices recommended there assumes certain standard conditions as to pile heights, floor loads, etc. We feel that the only correct basis for determining storage costs is the actual pile data found by physically measuring merchandise stored in the warehouse. One reason for this is that ceiling heights vary in different plants. Other unique features are floor loads and methods used in tiering different kinds of products. For example, when a cooler is equipped with low-hanging refrigeration coils it is necessary to "cut back" the upper layers of merchandise to prevent freezing. Such idiosyncracies led to the conclusion that actual pile data figures are better than theoretical ones built up on the basis of a product's density.

The reverse side of Form 3, Commodity Specification Card, is used for recording complete package and pile data. This side of the Form is shown as Form 8. The information recorded on the two sides of this card supplies the basic data needed in working up the storage cost for any particular commodity. These figures when combined with the financial factors we have been developing enable us to arrive at our final objective.

COMMODITY STORAGE SPECIFICATION CARD	STANDARD CONTAINER Wooden Case	TYPICAL PILE NO. OF UNITS 188	
LENGTH FT.	2.17	8.75 FT.	NO. 4
WIDTH FT. (MAX. DIAM.)	1.0	6.50 FT.	NO. 6
HEIGHT FT.	1.0	8.75 FT.	NO. 8 on 7 NO. 7 on 1
AREA SQ. FT.	2.17	56.9	
VOLUME CU. FT.	2.17	497.7	
WEIGHT LBS. GROSS	55	10,340	
WEIGHT LBS. NET	43	8,084	
FL. LOAD LBS. G./SQ. FT.	25.3	181.7	
DENSITY LBS. G./CU. FT.	25.3	20.8	
SQ. FT. PER 100 LBS. G.	3.9	.550	
SQ. FT. PER T. U.	2.2	.303	
XXXX T. U.'s PER 1000 SQ. FT.	460 cases	3,300 cases	

COMMODITY STORAGE SPECIFICATION CARD	STANDARD CONTAINER Carton	TYPICAL PILE NO. OF UNITS 24	
LENGTH FT.	2.42	1.45 FT.	NO. 2
WIDTH FT. (MAX. DIAM.)	1.63	7.30 FT.	NO. 3
HEIGHT FT.	.71	6.60 FT.	NO. 4
AREA SQ. FT.	3.94	10.59	
VOLUME CU. FT.	2.80	69.89	
WEIGHT LBS. GROSS	127.3	3,055	
WEIGHT LBS. NET	122.3	2,935	
FL. LOAD LBS. G./SQ. FT.	36.5	288.5	
DENSITY LBS. G./CU. FT.	45.5	43.7	
SQ. FT. PER 100 LBS. G.	3.095	.347	
SQ. FT. PER T. U.	3.222	.361	
LBS. XXXXX PER 1000 SQ. FT.	31,040 net	277,000 net	

Form 8—The reverse side of the Commodity Storage Specification Card. Two examples of the use of this form show Shell Eggs, left and Boneless Beef, right. Note—the other side of this card was shown as Fig. 3.

The commodity unit around which storage costs are built, as shown in Form 8, is the same as the unit used in the company's tariff—container, each, 100-pounds gross or net as the case may be. This is done in order to make it possible to compare storage costs and tariff charges on a uniform basis.

Form 9—Commodity Storage Costs—is used as a permanent record of individual commodity storage costs. Two examples of this record are given, one for shell eggs, the other for boneless beef. Lest there might be some confusion in the mind of the reader who glances at these two examples it is necessary to call attention to the fact that for eggs the unit is the case and for boneless beef, 100-lbs. net.

The amount of space available—or the reverse, the amount of space occupied—as everyone in the industry knows is not arrived at in a uniform manner. This is not the place to comment on the relative merits of the various ways in which the percentage of occupancy may be calculated. Suffice it to say that the percentage should be recorded for the month in question because the figures we are about to develop are based on 100 per cent occupancy so that one monthly figure at least must be modified to what it would be, should occupancy be less than 100 per cent. We shall cover this point more fully toward the close of this Part when we discuss the use of these figures for standard cost purposes.

Some mathematical calculations are required in working

COMMODITY STORAGE COSTS — PILE DATA .303 SQ.FT/T.U. — COOLER xxxxx, FREEZER, SHARP F. — COMMODITY Eggs, shell — CONTAINER Case — TARIFF UNIT Case

MO.	REPT'D OCCUP'Y	ACTIVITY		COSTS OF		COMMODITY REF'G'N DATA			TOTAL	STORAGE COSTS	
		CLOSING INVENTORY	RECEIPTS	REF'G'D SPACE	TON OF REF'G'N	REC'G TEMP.	TONS REQUIRED	REF'G'N COST	REF'G'N REQ'D	HELD	REC'D &HELD
	%	T.U'S	T.U'S	¢/SQ.FT	¢/TON	°F	TONS/T.U.	¢/T.U.	TONS	¢/T.U.	¢/T.U.
Aug.	80	24,810	4,300	14.69	186.88	40°	.00140	.26	6.02	4.45	4.71

COMMODITY STORAGE COSTS — PILE DATA .361 SQ.FT/T.U. — COOLER, FREEZER xxxxx, SHARP F. — COMMODITY Beef, Boneless — CONTAINER Carton — TARIFF UNIT 100 lbs. net

MO.	REPT'D OCCUP'Y	ACTIVITY		COSTS OF		COMMODITY REF'G'N DATA			TOTAL	STORAGE COSTS	
		CLOSING INVENTORY	RECEIPTS	REF'G'D SPACE	TON OF REF'G'N	REC'G TEMP.	TONS REQUIRED	REF'G'N COST	REF'G'N REQ'D	HELD	REC'D &HELD
	%	LBS.N	LBS.N	¢/SQ.FT	¢/TON	°F	TONS/T.U.	¢/T.U.	TONS	¢/T.U.	¢/T.U.
Aug.	80	358,017	112,002	16.98	226.70	20°	.00350	.79	3.92	6.13	6.92

Form 9—These two examples of Form 9 show how it is used to enter the commodity storage data for shell eggs and boneless beef to determine unit costs for holding and receiving combined with holding.

The pile data and refrigeration required per tariff unit are taken from Forms 3 and 8 for each commodity. Although the pile information is placed at the top of the form, on the assumption that it remains constant for any given product and package, there is always the possibility that it may change. This would happen, for example, should machine handling be substituted for hand methods of piling. When such a change takes place, the pile data should be corrected and the date of the change noted so that we may know under exactly what conditions our figures were developed.

The second column in Form 9 headed Percentage of Occupancy is used to record this information on the basis of occupancy information compiled by the individual user.

up certain of the figures shown in Form 9. These will be explained for shell eggs and the reader will then have no difficulty in following how the corresponding figures were developed for boneless beef. Once again attention is called to the fact that two different units are used for these products, the case for shell eggs and 100-lbs. net for beef.

Under Commodity Refrigeration Data the Refrigeration Cost in cents per tariff unit is found by taking the tons of refrigeration per tariff unit (.0014 tons per case from Form 3 at 40 F) and multiplying it by the cost per ton of refrigeration (186.88c per ton) which results in the figure of .26c per case.

The Tons of Refrigeration required to bring all the commodity received during the month down to cooler tempera-

ture is found by multiplying the number of cases received (4,300 cases) by the tons of refrigeration per case (.0014 tons). It required, therefore, 6.02 tons of refrigeration to chill the eggs received in August to cooler storage conditions.

Two different kinds of unit storage costs are indicated. The first—called "Held"—reflects the cost of holding shell eggs in refrigerated cooler space. It is found my multiplying the number of square feet of storage space occupied by a case of eggs in pile (.303 sq. ft.) by the cost per square foot of refrigerated cooler space (14.69c per sq. ft.) or 4.45c per case. The second cost—"Received and Held" is found by adding the cost of bringing a case of shell eggs from receiving temperature to room temperature to the "Held" cost. When we add .26c per case to 4.45c per case this final figure 4.71c results.

When we have worked up the same kinds of figures for boneless beef we have the final unit costs for both commodities for which we have been striving. It is difficult, however. to compare the costs of these two products because they have been found on a different basis. Let us, therefore, convert the unit costs for shell eggs to a 100-lb. basis. We shall also, without showing the details of how the figures were arrived at, add the unit costs of boneless beef which was received fresh-to-be-frozen during the same month. This gives us three different kinds of products to discuss.

STORAGE COSTS PER 100-POUNDS

	HELD	RECEIVED AND HELD
Eggs, Shell	8.40c	8.89c
Beef, Boneless, rec'd at 20 F	6.13c	6.92c
Beef, Boneless, rec'd at 40 F	6.13c	14.89c

These figures reveal that although boneless beef (received frozen) is stored in a freezer its cost per 100-lbs. is less than that for shell eggs when calculated on the same unit basis. The reason lies, of course, in the fact that beef is more dense than eggs and this factor is sufficient to counteract the higher cost per square in the freezer. Furthermore, the fact that the frozen beef is received at a low temperature offsets the increased cost per ton of refrigeration in the freezer as compared with the corresponding cost in the cooler. On the other hand, look at what happens when beef is received fresh-to-be-frozen. The storage cost remains the same, but the increase in the Received & Held figures, 7.97c, measures the cost of freezing 100-lbs. of this product. Had the freezing and storage been done in the sharp freezer both unit costs would have been even higher, due to the higher space and refrigeration costs in this class of space and the lower temperature to which the meat must be brought for storage.

How to Use the Data

Now that we have found individual commodity costs which have been built up from other unit costs what use can be made of these figures? Let us see how they can be helpful for control purposes and in comparison with tariff rates.

First, as to controls. Practically all the different unit costs developed—unrefrigerated cost per square foot, refrigerated costs per square foot and the cost per ton of refrigeration for each kind of space—any or all of these can be used. Let us take as an example the costs of refrigeration and see how they can be put to work.

Figures of this character become significant only after they have been kept up over a considerable period of time. Their greatest value is in using them for comparison purposes—the results of one year against those of a previous period. They are best presented for this purpose in graphic form, as shown in Chart 4, where the cost per ton day and the tons of refrigeration per day for freezers are shown for each month of the year. The paper used for plotting the two curves is ruled logarithmically in order to make the changes more significant. Note, for example, that the upward slant of the "tons per day" line is sharper than the downward slope of the corresponding "cost" line. This reflects the influence of fixed expenses on total refrigeration costs. The reverse tendency shows up in the slopes of the tonnage and the cost lines during the later part of the year.

Another interesting relationship could be shown by plotting the mean temperature for each month. This would be particularly valuable after the first year because the temperature factor might very well account for wide variations in tonnage and costs.

The best way to plot several years on one graph is to use different color lines or different kinds of lines (solid, broken, etc.) for each year. When this is done variations for any month in a given year become strikingly evident. Graphic representations of this kind are very useful in bringing to light changes in costs which should be investigated.

No two organizations require the same kinds of control figures so that it is left to the reader's judgment to decide which of the unit costs can be most useful to the executives of his company.

Some warehouse executives still discount the value of individual commodity cost figures. Their attitude is usually expressed by saying, "What good are they after you get them? Competition, not costs, makes tariff charges." There is not time here to refute this type of thinking. We shall assume, therefore, that top management appreciates the value of such information and will demonstrate how the monthly figures collected throughout the year are converted to a unit cost which can be used for tariff comparisons or any other useful purpose.

Average or Annual Costs

It goes without saying that the individual commodity unit storage costs vary from month to month and, therefore, in order to arrive at a figure for rate-comparison purposes we must find an average figure—one which is weighted to take account of a given product's activity during different months of the year. Furthermore, the percentage of occupancy during the year influences the final figure. If occupancy is fairly constant, monthly variations in this factor need not concern us, but if there are wide variations they must be taken into account as described below.

Consider the figures for shell eggs for the month of August. During that period 24,810 cases were carried in storage and 4,300 cases were received. We find that the total cost of holding eggs was $1,104.05 (24,810 x 4.45c) and the cost of chilling them an additional $11.18 (4,300 x 26c). During this particular month the occupancy was 80 percent. This means that the "Held" cost of each case was not 4.45c but actually 4.45c x 100/80 or 5.56c, and the total cost of holding eggs for the month was, therefore $1,379.44. If we plan to inject the occupancy factor for each month we would use this latter figure in the next phase of our calculation work. If, on the other hand, occupancy is fairly uniform, say close to 75 percent each month of the year, we can modify the total of all "Held" costs by 100/75 instead of making the calculation for each month. This procedure is necessary only in the case of "Held" costs—the unit cost of chilling is, for all practical purposes, independent of volume and does not need to be modified with change of occupancy.

At the end of the year total inventory and total "Held" costs are run up. When we divide the latter by the former the resulting figure is a weighted monthly unit cost for stor-

ing (holding) a case of shell eggs based on the inventory carried each month and the current cost of storing that inventory.

The same procedure is followed to arrive at a weighted cost of bringing the product down to storage conditions. This element is the difference between "Held" and the "Received and Held" figures. This difference, multiplied by the number of cases of eggs received gives the total cost of chilling for a given month. To arrive at a weighted cost, the total cost of the element for a year is divided by the total number of cases received during the period. When we add the two weighted unit costs together, we arrive at the desired figure—a unit storage cost for shell eggs. This is the figure used for rate-comparison purposes.

The Commodity Storage Costs (Form 9) record supplies the information necessary to develop two other useful figures. The number of turnovers of a product during a year is found by dividing the total inventory by the total receipts. If we now divide 12 by the number of turnovers a year, we learn the average number of months the product remains in storage. Every warehouseman knows the value of this relationship.

After Commodity Storage Costs records have been kept up for a year the question arises as to whether the procedure must be followed indefinitely. Fortunately this is not necessary. The reader will recognize that the Commodity Storage Costs are not an integral part of the company's general accounting records. All storage costs are distributed through the two vouchers provided in our procedure. The Commodity Storage Cost record is, therefore, purely statistical. This being so, it is possible to build up synthetic costs for any product provided the unit costs for refrigeration and storage, as calculated in Form 7, are maintained. Of course, the information taken from the Commodity Specifications Card (Forms 3 and 8) must be available. Furthermore, if we are to be in a position to develop synthetic weighted storage costs we must know the occupancy and for the given commodity the monthly inventory and amounts received. There is little to be gained and much paper work involved in calculating unit storage costs month after month when it is possible to determine these costs synthetically at any time. Of course, the simplest procedure is to adopt standard or budgeted costs.

We have mentioned several times that the whole subject of standard costs is too broad to cover in detail here. We shall, therefore, confine this discussion to a few general remarks which an accountant, familiar with this technique, will be able to apply with little difficulty.

The use of standard costs can, in this instance, be approached from two different angles. The first is to use the unit storage costs developed as outlined here as the basis for standard accounting. This involves applying the standards for "Held" and and for "Received" to the inventory and receipts for each product each month (provided, of course, a **monthly** Profit and Loss Statement is to be drawn up). At the end of the year it will then be possible to check the difference between all the actual storage and refrigeration costs with the total standard commodity storage costs. Variations would be studied as the basis for standard costs for the ensuing year.

The second and simpler procedure is to use a budgeted cost per ton of refrigeration. The one element in this unit cost which was not budgeted was the expense of power because we wanted to develop a cost which would reflect the influence of this factor on the cost per ton at different times of the year. Chart 4, which shows us the relationship between tonnage requirements and the cost per ton day, is the key to budgeting on a flexible basis. From the engine room records (ammonia, water or brine flow) we calculate the total tonnage requirements for the month and from

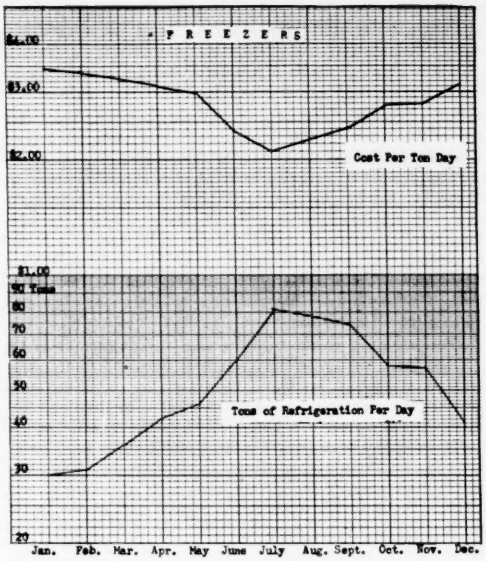


Chart 4—Tons of refrigeration per day and the cost per ton day for refrigeration are shown in curves on semi logarithmic paper.

Chart 4 we secure the corresponding cost per ton. Since the only element in the cost which has not been previously budgeted in power expense, we find the flexible element very readily. We can go even further and break down our total tonnage into that required for space and that for commodity by making used of Chart 2 (Part III) where the dead load (space) losses can be found for any given outside mean temperature. With these suggestions, the accountant will be able to see how much time and many calculations can be avoided and yet keep the figures under control.

CORRECTION—Refer to Form 2, work sheet on page 32 of the November, 1949 issue. At the lower right is the "Summary of Room Losses (or Gains)." The values for Air Changes Losses of 967.3 and 1,168.9 should be circled to indicate that they are negative values. The explanation is given at the lower left under "Room Losses Due to Air Changes." The "Admitted Air" enters through the elevator shaft and as shown in this table is 20 F (outside air temperature—10 degrees). Thus the admitted air is 10 degrees below room temperature and the heat gain is negative.

Refrigeration Protects Art Treasures

REFRIGERATION was used recently to safeguard $80,000,000 worth of paintings, on their way from Austria to the National Gallery of Art in Washington. The Art treasures from the collections of Vienna, loaned by the Austrian government, were transported in the refrigerated hold of the U.S.S. Malabar. They included paintings by Rembrandt, Reubens, Van Dyke and Titian and are part of the Austrian Imperial collection.

To prevent any deterioration or damage from bad weather or voyage conditions, Commander Merrill of the Malabar reports that the humidity was held at about 70 per cent and temperature at 65 F. Cold air was pumped into the hold during the day and it was sealed at night. The pictures arrived at their destination for display in excellent condition.—CANADIAN REFRIGERATION JOURNAL.

Court Decisions

By Leo T. Parker

Principles of Business Law Established by Decisions of Higher Courts on Border Line and Unusual Cases

RECENTLY a reader wrote as follows: "Our company has been manufacturing ice in the same location for 10 years. A few weeks ago the city council passed an ordinance zoning the locality, in which our ice plant is located, exclusively for residents. Just about this time we started to expand our plant for the manufacture of windows, doors, etc. We intend to use our present source of power for operation of machinery needed to manufacture doors, windows, etc. Our problem is this: Since the locality of our ice manufacturing plant is now restricted exclusively for residents can we continue to manufacture and sell ice? Also, can we enlarge our plant and manufacture doors, windows, etc?"

The answers to these questions is, as follows: Your company can continue doing the same business, as manufacturing and selling ice, as you have done before the city zoning ordinance was enacted. However, you cannot use the premises for any new business *not necessary* to the ice manufacturing business. Hence, you cannot manufacture doors, windows, etc. in this restricted locality.

Fortunately, I was able to locate a relatively new higher court decision which explains various and important phases of the law relating to validity of municipal zoning ordinances.

Restrictions on Continuing Business When Premises is Rezoned

For example, in Everpure Ice Manufacturing Company, Inc. v. Board of Appeals, 86 N. E. (2d) 906, reported August, 1949, the testimony showed facts, as follows: The Everpure Ice Manufacturing Company had been in the business of manufacturing ice in a city for many years when the city enacted an ordinance classifying the district, in which the ice manufacturing plant was located, exclusively for residents. Of course, since the ice company had been established in the restricted locality before the ordinance was passed its ice manufacturing business was not affected by the new zoning ordinance. However, the ice company in order to make a more profitable use of its premises, desired to establish a fuel oil business.

The company filed an application with the building inspector for a permit to build a small oil pump house, to install four underground fuel oil tanks each of ten thousand gallons capacity, and to use the premises for the storage and wholesale distribution of fuel oil. The building inspector refused to grant the permit, and the ice company appealed to the higher court. Since the fuel oil business is not a necessary addition to the business of manufacturing ice the higher court refused to issue the permit, saying:

"The only existing structure on the lot is the ice plant, and the only existing use to which the locus is devoted is the making and distribution of ice. The erection of this oil pump house is in no way connected with the manufacture and distribution of ice. It is intended for an entirely different purpose. And the same is true of the installation of the oil storage tanks . . . That it is more profitable for an ice dealer to have an oil business is immaterial . . . The test is whether the proposed use is a part and parcel of the ice manufacturing business. All the evidence shows that it was not connected with the ice business."

In other words, the higher court decided that the fuel oil business is an entirely new and different business from the ice business and that the fuel oil business is not a reasonably necessary additional structure or addition to the ice manufacturing plant.

Officials not Liable for Taxes

Modern higher courts consistently hold that a tax cannot be imposed except by express words in a state statute indicating that purpose. Also, the courts hold that officials of corporations are not personally responsible for payment of taxes by the corporation.

For example, in Cook, Commissioner of Revenues, v. Ayers, 215 S. W. (2d) 705, the testimony showed facts, as follows: The Standard Ice Company is a corporation with its executive and principal business offices in Memphis, Tenn. The corporation owns and operates ice manufacturing plants in several towns and cities in Arkansas. Its principal office is in Memphis and the corporation conducts its business wholly within Tennessee and pays income taxes to this state on revenues derived from all of its plants.

The state of Arkansas enacted a statute which imposed income taxes on nonresidents from every business carried on in the state. The state of Arkansas sued officials of the ice company to recover taxes on income derived from the ice company's plants located in Arkansas. The higher court held that the officials need not pay income taxes to the state of Arkansas, and said:

"Appellees (ice company) do not own property in this state nor is it shown that they have any interest in the Standard Ice Company except as officers and employees."

Services Ordered Must Be Paid For

According to a recent higher court an ice company must pay full price for services definitely ordered, whether or not such services were utilized.

For example, in Doup Ice Company v. Almand, 207 S. W. (2d) 601, the testimony showed facts, as follows: Officials of the Doup Ice Company and an architect named Almand made a verbal or oral agreement. Under this agreement Almand was employed to draw plans and specifications for rebuilding the Doup Ice Company's plant which had burned. It was understood that a regular architect's fee of 6 per cent of the cost of the building was to be paid to Almand who was to supervise construction of the building.

Almand furnished the company with rough drawings of the plan of construction contemplated. The parties held several conferences in which a complete understanding was reached regarding the kind of materials to be used in the building and other details of construction. Almand prepared the plans and specifications, which called for $12,000 expenditure. The official of the ice company, however, stated that the company was not going to invest more than $10,000 in the building and refused to accept the specifications and pay Almand.

Almand sued the ice company to recover the amount of $720.00 he would have earned on the job had the company officials fulfilled the verbal agreement.

During the trial the ice company officials testified that the company did not use the plans and specifications and at no time did Almand deliver or offer to deliver possession of the plans and specifications to them. Almand admitted this was true, but testified that the officials did not ask for them, and they were on a table where the officials could have had them. In view of this testimony the higher court awarded Almand a fee of $720, quoting:

"Where the architect prepared plans and specifications for building pursuant to an unconditional order or direction of the owner, he is entitled to recover for his services whether or not the plans are used if they substantially comply with the employers' instructions. So his right to compensation will not be defeated by the fact that the building for which the plans are prepared was never constructed . . ."

Compensation for Real Estate Broker

Considerable discussion has arisen from time to time over the legal question: Under what circumstances is a real estate broker entitled to receive a commission for sale of an ice manufacturing business? The answer is: "A real-estate agent who has been instrumental in producing a purchaser for the ice business listed with him for sale is entitled to his contract commission." Otherwise the broker is not entitled to any commission.

For example, in Albers v. Ziegler, 37 N. W. (2d) 590, the testimony showed facts, as follows: One Ziegler signed a contract with a real estate broker agreeing to pay $1,250 if he sold the ice manufacturing business.

The broker ran a blind ad in the World Herald advertising this business for sale. Soon afterward one Fickler called the telephone number listed in the ad and talked with the broker who informed Fickler of the location of the business. Fickler had previously known of this business, its location, and that it was for sale. Later Fickler purchased the ice business from Albers, its owner. The broker sued Albers for $1250.00 commission but the higher court held that the broker was not entitled to a recovery since he had not been "instrumental" in selling the business. The court said:

"We do not think the plaintiff (broker) was the procuring cause of the sale for it does not appear that he started the negotiations."

Income Tax Deduction Must Be "Necessary" to Business

According to a recent higher court an ice company cannot make a valid deduction of expenses for income tax purposes, unless the expense is "necessary" for profitable operation of the business.

For example, in City Ice Delivery Company v. United States, 176 Fed. (2d) 347, the testimony showed facts, as follows: The City Ice Delivery Company was organized under the laws of North Carolina by the Southern Ice and Coal Company, Standard Ice and Fuel Company, Avant Fuel and Ice Company, and Wiggins Ice and Fuel Company for the purpose of establishing a retail outlet for ice manufactured by these companies. The Wiggins Ice and Fuel Company owned 6 per cent of the City Ice Delivery Company's stock. The retail corporation was obligated to purchase 6 per cent of its ice from the Wiggins Company. Later the Wiggins Company exercised an option to discontinue the manufacture of ice and receive a part of the money received on six per cent of the ice tonnage sold by the retailer.

In subsequent litigation the higher court held that the City Ice Delivery Company could not deduct for income tax purposes, the money paid to the Wiggins Company.

Scope of Employment

Modern higher courts consistently hold that an employee injured "outside the scope of his employment" cannot receive compensation for the injury. According to a recent higher court an employee is within the scope of his employment when doing anything for his employee's benefit or interest. However, the employee is outside the scope of the employment when performing an act solely for his own benefit.

For illustration, in Stuhr v. State Industrial Accident Commission, 208 Pac. (2d) 450, the testimony showed facts, as follows: One Stuhr owned his own truck and paid the expense of operating and maintaining it. He was paid by his employer on the mile basis for delivery of ice. One day, during working hours, the employee sustained severe injuries while he was repairing a spring on his own truck. Stuhr sued the employer for compensation under the State Workmens' Compensation Act. The higher court refused to award compensation, and said:

"Plaintiff (Stuhr) was employed to haul, not to do the work of a mechanic."

This court indicated that if Stuhr had been working on a salary and the truck was owned by the employer, Stuhr would have been entitled to compensation because when repairing the spring of the truck he would have been performing work for the benefit and interest of the employer. However, since Stuhr owned the truck, his act of fixing its spring was solely for his own benefit.

What Is a Manufacturing Concern?

Considerable discussion has arisen from time to time over the legal question: What is a "manufacturing corporation"? The answer to this question is important because many states have passed laws taxing manufacturing corporations whose main offices or headquarters are in other states.

For example, in Assessors of Boston v. Commissioner of Corporations and Taxation, 84 N. E. (2d) 129, the testimony showed facts, as follows: The state of Massachusetts passed a law taxing corporations located in other states engaged in "manufacturing" in the state of Massachusetts.

This court held that a company which produces merchandise, as ice, in the state of Massachusetts, and makes shipments to purchasers in the state or other states must pay taxes to the state of Massachusetts.

For comparison, see Hittinger v. Inhabitants of Westford, 135 Mass. 258. This court held that one who cuts and stores ice in the state of Massachusetts is not a manufacturer, and not subject to payment of taxes to the state. On the other hand, this court indicated that a company which has a plant for making ice is a legal manufacturer and, therefore, subject to taxation.

Carrier's Taxing Law

According to a recent higher court, employees who work for an ice company which perform contract services for a railway company are not subject to taxation under the Carriers Taxing Act, 26 U.S.C.A. Int. Reve. Code.

For example, in Reynolds v. Chicago, St. P., M. & O. Ry. Company, 168 Fed. (2d) 943, it was shown that a company was engaged in the business of furnishing various contract services to railroads. It entered into a contract with a railroad involving the placing of coal in bins or chutes, coaling locomotives, storing ice, and icing refrigerator cars.

In subsequent litigation the higher court held that the company is not liable for employment taxes under a state law on workers who performed the services.

In other words, this court decided that employees cannot be taxed under the Carriers Taxing Act, 26 U.S.C.A. Int. Rev. Code, if the testimony shows that they worked for a company which had contracted to perform services for a railway company.

Damages for Death of Child

According to a recent higher court $3,780 damages is proper allowance for death of a three and one-half year old child killed as a result of an ice company's negligence.

See Laferriere v. Augusta Ice Company, 60 Atl. (2d) 517. In this case the testimony showed that the child was killed by negligence of the ice company's motor truck driver.

For comparison, see Lewiston v. Augusta, 112 Me. 96. Here a jury awarded $1,811 for the death of an eight year old child. A remittitur (refund) was ordered of all the verdict in excess of $500. And in Blanchette v. Miles, 27 A. (2d) 396, an award of referees of $1,000 for the death of a twelve year old child was upheld by the higher court as reasonably adequate.

Interpretation of "Interstate" Commerce

It is well established law that an ice company which manufactures and sells ice to purchasers in the state ordinary is not subject to the Fair Labor Standards Act. However, according to a recent higher court an ice company which sells ice to a company whose employees manufacture goods sold and shipped in interstate commerce must pay wages specified by the Fair Labor Standards Act.

For example, in Hollasch v. Mountain Ice Company, 62 Atl. (2d) 218, the testimony showed facts, as follows: A wooden mill is engaged in production of goods for interstate commerce and maintains a cafeteria, as a means of advancing uninterrupted production. The Mountain Ice Company did not sell ice shipped in interstate commerce, but its employees delivered ice to the mill. The ice was used primarily for refrigerating food and soft drinks in the mill's cafeteria.

Certain employees of the Mountain Ice Company sued to recover unpaid overtime compensation, liquidated damages, attorneys' fees and costs.

The counsel for the ice company contended that the company was not subject to the Fair Labor Standards Act because it did not manufacture nor sell ice in interstate commerce.

It is interesting to observe that the higher court held that the employees must be paid wages specified by the Fair Labor Standards Act because they are engaged in an occupation necessary to "production of goods for commerce." This court so held because the ice company supplied ice to refrigerate foods and soft drinks used by the mill employees who performed interstate work. The court said:

"It is not necessary that the employee come in actual physical contact with the goods produced. It is enough if his work constitutes an essential or useful part of an integrated effort by which goods are produced for commerce. It meets the requirements of the Act if the work of the employee has much 'close and immediate tie with the process of production for commerce' that it is in effect a part of it . . . My conclusion is that plaintiffs (ice company's employees) were engaged as part of an integrated effort, in a process or occupation necessary to the production of goods for commerce, within the meaning of the Act."

Hence, irrespective of the fact that an ice company sells its products exclusively to local purchasers, yet it must pay wages specified by he Fair Labor Standards Act to its employees, if it sells ice to firm or companies who manufacture goods for interstate commerce.

Keeping Sidewalks Free of Snow and Ice

From time to time in the past various officials of ice manufacturing plants have asked this question: What degree of care is required to keep sidewalks clean of ice and snow to eliminate liability for injuries to pedestrians? The answer to his question is given in the case of Miller V City Ice and Fuel Co., 69 Atl. (2d) 140.

In this case a pedestrian sued an ice company for damages because of injuries sustained when he slipped and fell on ice in front of the ice company's premises. The higher court refused to hold the ice company liable, because the testimony showed that the accumulated ice and snow was apparent to the pedestrian and, therefore, he could have avoided the injury by using ordinary precautions to safeguard himself against injury.

This court said that the company would have been liable if the pedestrian had proved that he fell because the accumulation of ice and snow was unusual and actually was an obstruction, such as a dangerous situation, not apparent to the average person, or that it constituted an unreasonable obstruction known to the officials of the company and that they neglected to remove it within a reasonable period of time after the accumulation.

In other words, a company is not liable for injuries to persons caused by ice and snow on its sidewalks, unless the testimony shows that an unusually dangerous situation existed.

Air Conditioning Important to Health

CLEANLINESS of the air we breathe ranks in importance with the purity of the food we eat and the water we drink", said L. C. Bastian, Technical Director of Air Conditioning and Refrigerating Machinery Association, in an address before a Weather and Building Industry Conference sponsored by the National Research Council at Washington. "Daily each of us eats about three pounds of food and consumes some four pounds of liquids. In the same period, we take into our bodies about thirty-four pounds of air, almost ten times as much air as food or drink. Though that large volume of air intake may be heavily laden with contamination, little thought is generally given it as a source of disease infection of many kinds", Bastian stated.

In discussing the importance of controlled air conditions to the human system, he emphasized that while air temperature, humidity and proper circulation are basic factors, air cleanliness and the shutting out of distracting noise are of almost equal importance.

Pointing out the essentiality of humidity control in providing comfortable and healthful air environment for human beings, Bastian cited as examples conditions in New Orleans, Louisiana, and Phoenix, Arizona. "With a temperature of 95 F and a relative humidty of 60 per cent in New Orleans", he said, "the average person is more uncomfortable than he would be in Phoenix with a temperature of 105 F and a relative humidity of 25 per cent."

Bastian stated that, while hotels, restaurants, theatres and other types of service establishments, processors of many kinds of manufactured goods, and hospitals are large users of air conditioning, the market with the largest potential of all, the American home, has hardly been touched. "When people realize the great health benefits inherent in air conditioning, relief from oppressive heat and humidity, the shutting out of harmful dirt and dust swirling in through open windows, the blessing of a restful night's sleep, the surcease from unnecessary torment for the sick, then summer air conditioning will be generally considered as essential to the home as winter heating", he concluded.

New Mechanical System for Refrigerator Cars Maintains Even Temperatures

THE development of a new system for the mechanical refrigeration of railway cars carrying perishable goods, that will maintain automatically any temperature from minus 20 to 60 F. has been announced by the United States Thermo Control Co., Minneapolis, Minn.

The new system known as Model RY occupies a sealed-off space of about five feet at one end of the car. Each of the units is approximately 54 inches in length, 40 inches high, and 44 inches wide. Its two main sections are divided by an insulated bulkhead, and the whole unit is mounted on a frame of heavy-gauge aluminum.

One section contains a four-cylinder, liquid cooled engine, compressor, condenser coil, controls and instruments. The second section has a cooling coil and blower. A protective door covers the unit on the outside of the car. It can be raised by means of a crank and the entire unit pulled out on a sliding frame, much like one pulls the drawer out of a filing cabinet.

Operation of the mechanical refrigeration-heating unit is entirely automatic. Once a load of meat or fruit has been put on board, the operator adjusts the thermostat outside the car to the correct holding temperature for the cargo and seals it at that setting. Then he snaps the starter switch. When the temperature inside reaches the thermostat setting, the unit stops. Later, when the temperature rises slightly the engine automatically starts again.

Refrigeration is accomplished by the "cold wall" principle; that is, air circulates through ducts lining the inner surface of the car. Air is forced out from the cooling coil through the floor duct, then upward through wall ducts and to the ceiling. The air returns to the cooling coil through a grille in the insulated bulkhead separating the mechanical units from the interior of the car. Use of forced air assures uniform temperatures throughout the car.

Defrosting of the cooling coil is automatically controlled. Frost is melted from the coil by reversing the unit briefly and causing hot refrigerant gas to flow through it.

Two fuel tanks, of 155 gallon capacity each, are located under the car.* This is more than ample supply for a cross-country trip. Batteries for each unit are housed in boxes at each side of the car. The batteries are kept charged by the generator in the unit enough to carry the system across the country without refills. Only cursory inspection of the system is necessary at certain railroad division points where the trains are stopped regularly for change of engines and to check the cars.

Advantages Listed

Certain definite advantages of the Thermo King system have been proved by the more than 50,000 miles of operation in the United States and Canada. These advantages include:

1—Any desired level of temperature can be maintained indefinitely and with a minimum of variation in different parts of the car.

2—The two units offer dependability, stand-by protection, ease of maintenance and operation.

3—The cost of refrigeration by mechanical means is less than by ice.

4—Substantial savings in time and man-hours through elimination of icing, re-icing, and de-icing. Faster service to shippers and receivers.

5—Reduction of car maintenance costs and extension of car life through elimination of corrosive brine.

6—Reduction of maintenance and replacement costs of rails and bridges now damaged by brine drippings.

7—Elimination of loss claims because of dependability, accurate temperature control, and combination cooling-heating service offered by Thermo King.

8—Elimination of cost of maintaining ice tanks, valves, hatch plugs, and cost of eliminating tanks and bunkers.

9—The complete Thermo King system weighs approximately 3,000 pounds, representing a great saving in weight over ice.

Adaptation of Truck Units

U. S. Thermo Control is a pioneer in transport refrigeration. The firm enjoys a national reputation in the mechanical refrigeration field through the more than 8,000 trucks and trailers that are equipped with automatic, gasoline driven Thermo King refrigeration units. Company President J. A. Numero said the new railroad refrigeration system is an adaptation of the truck and trailer refrigeration units. "We hope to do for rail refrigerated transport what we have already done in the trucking field," he said.

Numero said that railroad mechanical refrigeration means more field-ripened fruits and vegetables on grocer's shelves; and it also means that for the first time in history frozen foods now can be shipped at zero temperatures or lower.

Chief advantage of the system is that it will keep fruits, vegetables, meats and other produce at constant temperatures whether it is 30 degrees below zero or 100 above outside the car. When the inside of the car gets too warm, a thermostat automatically turns on the refrigerating unit until the desired temperature is reached. Or, if conditions get too cold in the car, the unit reverses itself and warms things up to the pre-set temperature.

New Canadian Refrigerator Cars

THE first units of an order for 350 new steel refrigerator cars for the Canadian Railway have arrived in Montreal from the National Steel Car Corp., Hamilton, Ontario. Featuring the installation of a new locking mechanism on sliding doors that is easier and faster to operate, the cars should all be on the road by the beginning of the new year. The cars measure 40 feet in length on the inside, and have a capacity of 2,268 cu. ft. They weigh 63,000 pounds.

New Great Northern Refrigerator Cars

THE construction of 450 new rail refrigerator cars for the Great Northern Railway will get under way in the early spring at the Renton, Wash., plant of the Pacific Car and Foundry Co. The contract was awarded by the Western Fruit Express Co., a Great Northern wholly-owned subsidiary. Cost of building the cars is estimated at $3,870,000. The 50-ton cars will be of a new sliding-door type with all steel sheeting and a capacity of 100,000 lbs. Each will be equipped with side wall flues and ventilating fans and will have the latest and most effective type of insulation.

The Ice Industry

National Association of Ice Industries

Executive Offices
1706 L St. N. W., Washington 6, D. C.

PRESIDENT
H. O. McLain, Chicago, Ill.

EXECUTIVE SECRETARY
Mount Taylor, Washington, D. C.

Cooling with Ice Enhances Quality and Value of Produce Grown for Local Use—Growers and Distributors Offer New Market

ICE used for hydrocooling of fresh produce for local consumption enhances its quality and value, according to a recent bulletin issued by the Research and Engineering Department of the National Association of Ice Industries. The particular products covered in this discussion include peaches, vegetables and sweet corn.

Hydrocooling, the report states, is an accepted method of preparing many fresh vegetables for shipment to distant markets. Its application to the handling of peaches is new. In general the produce trade has avoided wetting of peaches. However, the 1947 outbreak of brown-rot fungus gave impetus to new techniques. Excellent results were obtained through removing the field heat from peaches at the time of harvest by use of an ice water bath to which a chlorine compound had been added. (A report on these tests and the results obtained were published in the October and January issues of ICE AND REFRIGERATION) The study was continued in 1949, and a report on the second year's tests will be available in a few months.

Hydrocooling Vegetables

Hydrocooling and package icing of vegetables for local consumption is a subject which we believe will be of increasing interest to ice men, vegetable growers and consumers in 1950, and in the years to come. Much attention has been devoted to improved handling methods as a means of protecting quality of perishables which must move two or three thousand miles to market. As a rule, however, growers who cater to local markets have relied upon rapid handling to insure quality.

During the past few years, we have experimented with the use of ice in the marketing of vegetables which are grown and consumed locally. Our findings have been very encouraging and we expect to continue this work. A report on the study which was sponsored at the University of Massachusetts will be available in the spring. Others will follow.

Icing Sweet Corn

Icing of sweet corn for local markets is now gaining favorable recognition in a few areas. This Association and other interested agencies have sponsored several studies in this field. More work needs to be done, but our efforts are already paying off. Last year the Indiana Association of Ice Industries and the National Association sponsored a corn icing study at Purdue University. This work aroused the interest of the growers, the icemen and the consumers. It focused attention on the merits of iced corn. Growers and icemen were inspired by increased sales and greater profits. Consumers were enthusiastic about the improved quality.

Not only did the growers over the state who cooperated on the study ice their corn, but once the project was under way other growers observed the techniques and copied the procedure. Thus from a small research project, the study grew into a recognized marketing practice. This, of course, resulted in a new outlet for ice in several Indiana markets.

Proof from Minnesota

Hydrocooled vegetables for local consumption pays in Minnesota, and here's the proof. Two years ago the Winston-Newell Company, a large and progressive food wholesaling establishment in Minneapolis, went all out for iced vegetable displays in its sponsored retail stores. In 1948 these people experimented with the hydrocooling of corn and other products for local markets. In 1949, with the cooperation of the University Farm School and the Extension Service a commercial farm program was inaugu-

Ready Made Markets for Ice

Ice has long been used to chill and preserve produce shipped from areas where the distance to markets made the need of such refrigerated protection quite evident. It was assumed that produce marketed more quickly from local or nearer growing areas is sufficiently durable to be handled without refrigeration. Investigators have determined however that many fresh vegetables and fruits should have ice protection despite the relative speed of their distribution.

It has also been customary to harvest many products in a green or immature state to provide them with greater resistance to damage in packing, shipping and handling. This process defeats itself if the products such as peaches are harvested so green that they never reach desirable flavor, texture and color. The answer here too is to increase durability by chilling and protection with ice. Ice also provides a convenient method of refrigerated holding for produce when refrigerated space is not available.

With a recent Ice Research News Letter, C. P. Austin, N.A.I.I., distributed a brief illustrated report of the hydrocooling of peaches in Michigan and recounted a number of other applications of ice in the handling of produce. He suggests to the association members who received the letter that they proceed to the promotion of these markets.

rated. The Hydro-Coolers Association of Minnesota was organized. It consisted of growers who were willing to abide by prescribed standards in preparing their fresh vegetables for market.

G. E. Pannkuk who spearheaded the activity for the Winston-Newell Co. gave the following account of the merits of using ice to remove field heat at the time of harvest for handling vegetables for local consumption:

What we wanted was premium produce that would provide the right combination with our iced display and merchandising program . . . We intended to go right to the grower and see what could be done about it. Early this year we called a meeting of the major growers of this area and outlined the hydrocooling program to them. Attending the meeting were a number of food authorities and persons interested in agricultural research. We presented the recommendations for the program and received the complete endorsement of the growers . . .

Here are the facts that have justified hydrocooling to store owners and our firm. Sales comparisons for typical produce items are based on unit sales (not dollar volume) for 1949 over 1948.

Item	Sales Increase %
Carrots	2387.43
Radishes	225.21
Leaf Lettuce	167.71
Asparagus	156.65
Spinach	141.49
Green Onions	94.85
Beets	86.01

This story . . . is indeed impressive. The entire activity is to be expanded by this group next year. Accepted practices in the handling of long distance shipments are being successfully adapted on a commercial scale to local marketing methods. What's more, the dividends are high. Further work should be encouraged. Each successful experiment like this provides information which will encourage other growers and other merchants to study, consider and adopt improved procedures which make use of ice.

Markets and Wholesalers

Are you catering to the farmers' markets and wholesale establishments that handle fresh produce? Even businesses which have mechanically refrigerated coolers may need ice! Many that do not have such storage facilities may get along without ice when they could make profitable use of it!

Wholesale produce dealers and food chains often have peaks and emergencies when it is necessary to hold one, two or more truck loads of packaged vegetables for a day or so. Sometimes their stocks exceed their refrigerated facilities, or these storage rooms may not have the capacity to carry the load. In either case ice does a superb job. Top icing and layer icing for commodities which are commonly iced provide a safe and relatively inexpensive method of extending the protection of mechanically refrigerated units. Furthermore, layer icing furnishes an efficient method for holding for a limited time in non-insulated rooms packaged supplies of products which are usually iced in retail displays.

In 1948 at Ohio State University the U. S. Department of Agriculture, the Ohio Association and the National Association of Ice Industries sponsored a study in the icing of vegetables which were grown and consumed in the Ohio area. The tests indicated that an extremely effective job could be done for a short hold outside of insulated facilities by icing between the layers of packages and covering the entire stack. Such a procedure may have applications in your market.

Ice and agriculture have many interests in common. Let's make full use of the colleges. Are you in a sweet corn area? Has your state college explored the merits of icing corn for local markets? If so, we hope you are encouraging these people. Dissemination of the merits of proper use of ice will benefit both growers and consumers, and needless to say, it will put money in your pocket! If your agricultural college has not examined the value of icing sweet corn, we believe you will find it of value to discuss it with the proper people.

The same is true of other vegetable items grown for local markets. Improved handling procedures need to be developed, and are being developed. Ice can play a vital part in this trend. We have given you a glimpse of what is possible, but it will take time, work and study. This entire subject is a field of great interest to state college people, and one in which they can be very helpful. Many states have money to assist in exploring better marketing methods. If we can help you in working with your college, let us know.

Fire Destroys Florida Power and Ice Plant

ONE of the worst fires in the history of Fort Myers, Fla., on Deccember 25, destroyed the Florida Power and Light Plant and most of the ice plant leased by The City Ice and Fuel Division of the City Products Corporation. The fire, of undetermined origin, started about 5:00 a.m. and firemen were hampered in their efforts to combat the blaze by the explosion of transformers and tanks of ammonia. The estimated loss was in excess of $250,000.

Residents of Fort Myers were not without lights or ice however, as the Florida Power and Light rushed a mobile power plant to the city and City Ice and Fuel supplied customers with ice from their storage warehouse that was saved and also brought ice in from their operations in Punta Gorda and Belle Glade. Engineers are planning the replacement of these facilities.

Ice Man Appointed on Employment Advisory Committee

ANDREW COLIER, president of the Terminal Ice & Cold Storage Co., Klamath Falls, Ore., was one of the management representatives appointed by Gov. Douglas McKay to serve on a 10-member employment advisory committee in Oregon. Governor McKay said the new committee was created in conformity with the Wagner-Peyser Act requiring the states to establish advisory employment councils drawn from labor, management and the public. The group will act as an advisory board to committees being set up in counties and communities to deal with the unemployment problem at the local level. Headed by Dr. Calvin Crumbaker, head of the University of Oregon economics department, the committee also will function to enlist cooperation of state and federal agencies to work on problems which cannot be solved by the localities themselves.

The Iceman

By James J. Metcalfe
Newspaper columnist, in his column "Portraits"

He used to come in sloppy clothes . . . To knock upon your door . . . And leave his wet and muddy tracks . . . Across your Kitchen floor . . . But now he wears a uniform . . . And he is very nice . . . And in his special drip-proof bag . . . He brings your cake of ice . . . Or maybe you prefer it chipped . . . For oyster, shrimp or tea . . . In any case he is on hand . . . To serve you faithfully . . . He cools the milk and vegetables . . . In stores, hotels and such . . . And keeps the patient's fever chart . . . From going up too much . . . His product helps the railroad and . . . The chemist in his work . . . The farmer and the florist and . . . Of course the soda-jerk.

Employee Training Materials for Ice Service Men

A LIST of employee training materials available from the National Association of Ice Industries has been issued by the Personnel Training and Marketing Department.

A complete training course "Modern Practices in Ice Delivery Service" consists of a series of eight 7-page pamphlets fully illustrated and printed in two colors. It covers and develops all the principal selling and ice-selling points under eight subjects. It is suggested that this course be used in conjunction with sound films. The plan is that each man in training receive a copy of each of the eight pamphlets as he progresses through the course, and a binder in which to retain them. A manager's manual is a part of this program, presenting in chronological order the steps that should be accomplished in conducting successful training meetings.

A 24-page pocket size booklet "Service Manual for Modern Icemen" is especially valuable for new employees. It puts together in condensed fashion most of the ice service and sales pointers which all service men should know.

That there is need for safety and accident prevention work in the ice indusry is clearly evidenced by the fact that its accident frequency rate is topped by only two other industries. To instruct employees in safe methods of operation, a 24-page safety manual "One Way—The Safe Way" meets this need. To supplement this, a comprehensive safety manual for managers "Organize for Safety in the Ice Industry" details plans, suggestions and methods for organization and operating an ice plant safety program.

Two series of sound slide employee and dealer training film are available, consisting of eight basic training films and six supplementary training films and a dealer training film "Times Have Changed." Some of these films are in color and others are in black and white. All of them are of fifteen minute duration except "Times Have Changed" which runs thirty minutes.

The films may be ordered at any time. But since it will be necessary to reprint the printed material, a deadline of February 15, 1950 has been set for receipt of orders for printed material.

National Ice Marketing Institute Now Offered in Field Course

THE National Ice Marketing Institute, which was designed to meet the ice industry's needs for advanced training in selling and merchandising, is now available in abbreviated form to unit associations and other large groups of ice companies.

This field course covers principles and practices of merchandising, personnel selection and training and fundamentals of supervision. The course will be one week in duration (Monday through Saturday) and will consist of 33 hours of instruction. The National Association assumes all responsibility connected with the overall supervision of the course, such as providing instructors, special lecturers, equipment required, all text materials, etc. The participating unit association assumes the responsibility of securing enrollments, providing class room quarters and making hotel reservation arrangements.

The tuition fee, payable to the National Association, is $25 per enrollee. To this, the unit association may have to add a small additional charge for class room quarters if it is necessary to pay rent. A minimum number of 20 enrollees is required and 30 is the maximum number that can be accommodated from the standpoint of effective instruction.

Southern Ice Firms Charged with Monopolizing Icing Services

A FEDERAL grand jury in Macon, Ga., has indicted the Atlantic Co., of Atlanta, six of its affiliates and two of its major officers on charges of attempting to monopolize icing services in nine Southern sates. The indictment was announced in Washington January 5 by the Justice Department.

Attorney General McGrath said simultaneously that he was filing a civil anti-trust action against the same defendants, asking the court at Macon to enjoin them from "a continuation of the charged violations (of the anti-trust laws) and to restore competitive conditions." Among other things, the icing services involved are rendered to preserve shipments of fruits and other perishables in transit.

The announcement said that in addition to the Atlantic Co., Clinton D. Castleberry, of Atlanta, its president, and Fred W. Beazley of Atlanta, company board chairman, the following firms were named as defendants in the actions:

City Ice Co., Columbia, S. C.
City Ice Delivery Co., Charlotte, N. C.
Ice Service Co., St. Petersburg, Fla.
Orlando Ice Delivery Co., Orlando, Fla.
Southern United Ice Co., Jackson, Miss.

The attorney general alleged that this group had "unlawfully combined and conspired to monopolize and eliminate and suppress competition in the sale and distribution of ice and in the furnishing of icing services" in Georgia, Florida, North and South Carolina, Virginia, Tennessee, Mississippi, Louisiana and Alabama.

They were accused, among other things, of conspiring to fix noncompetitive prices in various market areas, to divide and allocate customers, to restrict the amount of ice to be manufactured and distributed, and to acquire the business of competitors.

Clinton D. Castleberry of Atlanta, president of the Atlantic Company said he had not had the opportunity of examining the indictment. "My information regarding its contents," he said, "is based upon the account as reported by the press. It seems to be another of the many anti-trust suits which the government is bringing against various businesses at the present time. It alleges that the Atlantic Company and some of its subsidiaries and officers have conspired to create a monopoly in the ice business. The company has been in business for more than 40 years in Georgia and the Southeast. I have been connected with it for 30 years. Mr. Beazley has been in this business for over 40 years. We have always had and now have the keenest sort of competition, both from other makers of ice and from mechanical refrigeration. We do not have a monopoly and have never sought to get a monopoly in the ice business.

"It has been the constant effort of the company and its officers to make and sell ice at a fair price to the consuming public. We think we have done so and are now selling it at reasonable prices everywhere in spite of all sorts of competition and greatly increased costs of operation. "We do not believe that we have violated any law, State or Federal. We expect to defend against these charges to the best of our ability, as they are unfounded."

New Ice Loading Dock

THE Pacific Fruit Express Co. plans an addition to the ice loading dock in the Southern Pacific Yards, El Paso, Tex. A city building permit has been issued for the addition to cost $115,771. The new dock, which is expected to be completed in April, will service 200 refrigerator cars. Present facilities can handle 140 cars.

National Ice Association Adds Assistant Advertising Manager

NEW assistant director of advertising and publicity for the National Association of Ice Industries, Washington, D. C., is John G. Pool, Jr.

John G. Pool Jr.

Mr. Pool was previously chief copy writer in the promotion department of The Washington Post. During his four years in that department he wrote all commercial radio copy, prepared promotional advertisements, direct mail pieces and special letters and edited the newspaper's house organ. Before the war he was traffic manager for the Mumm-Romer-Robbins and Pearson advertising agency in Columbus, Ohio. Earlier, he was a copy writer for the Parker Advertising Agency in Dayton. He graduated from public high school in Dayton, attended Miami University, Oxford, Ohio, for two years and obtained a degree in editorial journalism from Ohio State University in 1939. He was in the Army for three years, serving as navigator in an Eighth Air Force reconnaissance squadron.

Christmas Display Builds Public Relations for Ice Company

A CHRISTMAS display put on by the Purity Ice Co. of San Jose, Calif., provided excellent publicity and created a very favorable impression, particularly since it was the only such display in San Jose made from the exhibitor's product. Thousands of visitors saw this display and their comments indicated that they felt it was very much worth-while.

The display was located in a space approximately 30 feet wide and 12 feet deep beween the ice plant and a vending station. Everything in it centered about the theme of a "White Christmas." A public address system was used to play organ recordings of all the popular Christmas carols, every other record being the music "White Christmas." Real ice man's ice was used. Some forty blocks of ice were used for the original setting and snow was added from defrosting the small store room. Then each day one vending station would be defrosted and the snow hauled back to the plant to replace what melting occurred. Since the display was planned to last for about ten days, a solid ice floor was used.

Front and side view of Christmas Display presented by Purity Ice Co., San Jose, Calif.

The cross shown in the picture was made from a full 300 lb. block which was cut in half lengthwise. On top of this the other half was laid crosswise, and then an additional 50 lb. piece was used to complete the cross. It was found necessary to construct a new cross every two or three days. An igloo also was a part of the display, cut from white ice and left solid, to prevent rapid melting.

Three colored spotlights were used, synchronized to give desired Northern light effects which were in evidence as the reflections from the snow and ice were filtered through ceiling curtain drops of cheesecloth. The back wall space of the display was taken up by a transparent screen behind which was a projector showing Santa Claus and his sleigh and reindeer. This gave the scene a feeling of depth which otherwise could not have been attained.

Inside the engine room a glass top table was made up with changing colored lights to advertise and acquaint the people with packaged crystal clear ice cubes which the company sells in vending stations. This commercial plug did not in any way detract from the display, but did add to the opportunity of acquainting people with the company's products.

Indiana Retail Produce School

THE Indiana University Distributive Education Department has introduced a new course in Retail Produce Merchandising for retailers of fresh fruits and vegetables. This program is presented in cooperation with local public schools and National League of the Wholesale Fresh Fruit and Vegetable Distributors and is being conducted by G. Elwood Hookey of Indiana University. Utilizing the ice industry film "Naturally Yours", and stressing the necessity of proper temperature and humidity in handling produce, Mr. Hookey reports that his program is being well received by grocers and much interest in ice has been shown.

Indiana Driver Training Schedule

STARTING in January and lasting through April, a series of four evening sessions has been scheduled for a course in driver sales training under direction of the Indiana Association of Ice Industries. The course will be taught by G. Elwood Hookey of the Distributive Education Department of Indiana University. It is being offered in the following Indiana cities: Greensburg, Madison, Jeffersonville, Princeton, Vincennes, Irvington (Indianapolis), Lafayette, Bloomington, New Castle, Elkhart, South Bend and Gary. The first session was held the evening of January 4 and the final will be held April 20.

Ice Packages Must Carry Net Weight

A NOTE from the Indiana Association of Ice Industries advises all ice distributors that all ice companies must mark paper and canvas bags of ice with net weight contained therein. It is important that all ice companies take steps to mark bags accordingly since the Inspectors of the Weights and Measures Division will be checking for compliance with the regulation. Ice companies which have a supply of paper bags on hand may use rubber stamps to indicate net weight. When reordering additional bags, net weight can then be imprinted by the bag company.

Sweet Corn Icing Developed by Research Pays Dividends to Indiana Farmers

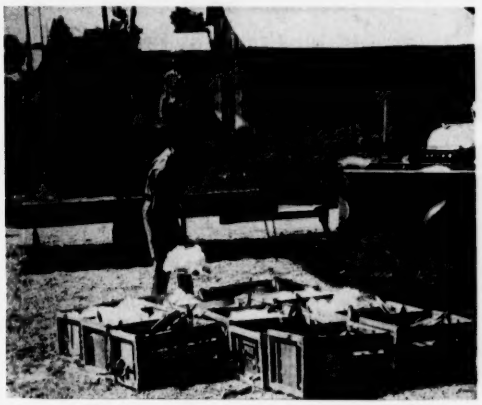
A STUDY on the effect of sweet corn icing being made by Purdue University at Lafayette, Ind., in cooperation with the Indiana Association of Ice Industries has begun to pay dividends. In a report from the Association last August, attention was pointed to over 600 acres of sweet corn in the state that was being iced before marketing. Joe Vandermark of the Purdue University staff was appointed to handle this work and he conducted tests on a number of farms near Princeton, Brownstown, Auburn, Shelbyville and in Marion County.

The work is educational, designed to show Indiana growers how they can increase profits by cooling the corn they send to market. First-hand information has been obtained from the above tests which presents detailed figures on the costs of icing and comparative increased prices obtained for the freshly iced produce.

The Indiana Association is cooperating by furnishing equipment and a quantity of ice for research. In this connection, an ice slinger was provided by the Link Belt Company and a gasoline motor to run the slinger by the Polar Ice & Fuel Co., of Indianapolis.

Valued publicity for the project was furnished recently when the Indianapolis Star (Sunday) Magazine ran a page article describing the process, telling how icing preserves the flavor of sweet corn, and illustrating the process with pictures, some of which are reproduced below.

Process of sealing flavor in sweet corn with use of crushed ice starts when ears are brought from the field.



Shovelsful of "snow ice" spread on top of crates starts icing process, holding down temperature which preserves natural sugar.

Here the shovel method is replaced by an ice slinger which blows pulverized ice into and over the crates. Holding the slinger hose is Leland Lush, manager Daniel DePrez Ice Mfg. Co., Shelbyville, Ind.

Final step at the farm is icing the entire load as it leaves for the market. Temperatures of 40 F are attained and held with crushed ice. These pictures were taken in Shelby County, near Shelbyville.

News Coverage at Ice Convention

OVERALL coverage of ice industry activities in the newspapers hit an all-time peak during the month of November, according to "Ice Public Relations Today" issued by the Public Relations Department of the National Association of Ice Industries. While the annual convention of the National Associaton of Ice Industries was in session in New York City November 15 to 18, more stories than ever before about ice appeared in major newspapers in the largest cities.

Of particular importance to icemen is the fact that the N. Y. Times, one of the nation's outstanding papers, had one of its best business news reporters, Hartley W. Barclay, in the convention hall every day. His keenness in pointing out the highlights of each speech developed leading news in the business section of the Times all during the week.

The N. Y. Herald-Tribune, although it gave the convention less prominence than the Times, had some ice news each day. One of its leading columnists, Harvey E. Runner, now syndicated, wrote a feature column on the recent survey of mechanical refrigerator customers a few days after the close of the convention.

The New York Daily News, with a Sunday circulation of over 4 million, ran a feature story on Dr. John Gorrie, inventor of the first American ice-making machine. The World-Telegram, N. Y. Sun, N. Y. Post, and N. Y. Daily Mirror all ran feature stories or reports on the convention.

As the result of an amusing story given to the World-Telegram reporter by the Public Relations Department, Edward R. Murrow network news commentator, repeated it along with some complimentary comments about the members of the National Association of Ice Industries. All three wire services—Associated Press, International News Service, and United Press—sent out stories to thousands of newspapers all over the country. Syndicated writers such as Edith M. Barber, food columnist, Rader Winget, and Elmer Roessner mentioned the progress of Icemen in their daily columns.

One of the popular syndicated columnists, James J. Metcalfe, author of "Portraits", featured the Iceman in his daily poem on November 12. Lots of pictures—hundreds, in fact, appeared all over the country when all three wire photo services distributed pictures of the Centenial Ice Queen. Picture stories of individual speakers at the convention were sent out to home town papers and the majority of them found their way into print.

Coincidentally, Western Grower and Shipper featured an article by F. X. Timmons, Publicity and Advertising Director, in its annual November special isuue, on the advantage of following through to the retail level in using ice. Fruit and Vegetable Review had scheduled another article by Mr. Timmons for its annual review edition in December. However, since the article was entitled "One Hundred Years of Ice Progress," it will be included in the first issue of 1950.

Other New York and Chicago commentators referred to the ice industry in various ways. On the Alfred McCann show—WOR (N.Y.) the story of the invention of the ice machine was told and the modern uses of ice explained. This particular program is one of the best received morning broadcasts in the New York Metropolitan area.

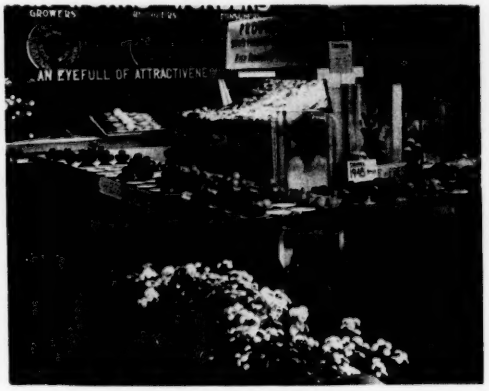
Nancy Craig—she broadcasts from New York—on her program keyed to better homemaking, talked about the 100th anniversary of the ice business and the various ways in which ice adds so much to living at so little cost.

In Chicago, Beulah Karney expressed surprise that the ice industry was making such excellent progress in the sale of packaged ice. She also commented on the comparison of ice sales now and ten years ago.

Vegetable Icing Display Makes Big Hit at Purdue Horticultural Show

AN ATTRACTIVE vegetable icing display was shown at the Horticultural Show held November 4 to 6, at Purdue University, Lafayette, Ind. The display, prepared under the direction of the Indiana Association of Ice Industries, produced some very valuable publicity for ice since the show was attended by some six thousand people from Indiana and adjoining states.

For the display two 8 ft. Trusty cases were used, with the theme, "High humidity and low temperatures assure vitamin rich and garden fresh vegetables." The iced vegetable cases were flanked by two 300 lb. ice shells containing fresh vegetables. Centered in the exhibit was a smaller ice shell containing two dozen roses.



View of table icing display at Horticultural Show at Purdue University

Members of the Horticultural Department at Purdue were lavish in their praise of the beauty of the exhibit and the ice men who prepared it were justly proud of the showing the product made in the show. The exhibit was made possible through cooperation of the Lafayette Ice & Coal Co., who furnished the equipment, ice and personnel to help build the display, and the Trusty Manufacturers who furnished the display equipment. Stands for the ice blocks were furnished by the Polar Ice & Fuel Co. of Indianapolis.

Florida Grocery Association Plans Modernization Program

A BROAD new market for commercial refrigeration and other equipment would result from a plan announced December 30 by the Florida State Retail Grocery Association for the construction of $22,000,000 worth of new grocery stores and the modernization of others with borrowed federal money. The program calls for construction of approximately 222 self-service groceries throughout the state, with the buildings to be sold outright to grocerymen or leased for 10-year periods.

The association plans to set up a corporation with power to borrow money for building the stores. The corporation then would apply for a $22,000,000 loan from the Reconstruction Finance Corp. To qualify for one of the stores, under the plan a grocer would have to show he has the experience and sufficient operating capital to run a store. Two grocers would be permitted to go in together on a store if they wished.

Exhibit at Arizona State Fair Tells Story of Ice Refrigeration

AN ESTIMATED 200,000 persons viewed the ice appliances marketed by Crystal Ice & Cold Storage Co., progressive Phoenix affiliate of City Products Corp., at the Arizona State Fair, November 4 through 13. In order to made the best presentation possible, D. Howard Green, vice president of the 36 year old Phoenix firm, had a scale model built of the display a month before the Fair opened. The model was complete even to the handle on an ice cream freezer. Since plans called for a theatrical stage setting, the correct placement and lighting arrangement was more easily worked out with the miniature.

Photograph of miniature model of ice exhibit booth shown by Crystal Ice & Cold Storage Co. at Arizona State Fair, Phoenix, Ariz. An estimated 200,000 persons passed through the Industrial Building where the Crystal booth was located.

As shown in the picture of the model, two ice refrigerators were used; a vegetable icing case completely stocked; two sizes of picnic chests; a beverage chest and an ice cream freezer, all with identifying placards bearing a sales message. In addition, a sandwich-type sign was placed on the beverage chest carrying the two themes used by the Ice Industry Exhibit in San Francisco last June—"Where Ice Is Needed and Used," and, "Ice is Needed Daily in Every Part of America."

Since the Crystal booth was in a corner location, facing two aisles, the outside corner of the exhibit contained a cut-out window through which a block of clear ice, set in a plastic tray and lighted from below, was clearly visible. The company logotype or advertising signature was painted on a piece of clear plastic and frozen inside the clear block, giving a mystifying effect of the name floating inside the ice.

Another unusual effect for attention value was obtained by placing one of the ice refrigerators and the vegetable case in simulated picture frames, with colored lights in the background, rotating in series. Spotlights set above the booth picked out the gleaming white-enamel surfaces of the appliances.

With six plants in the Phoenix area, and over three decades of service, Crystal Ice & Cold Storage Co., is well known throughout Arizona. In addition to participating in such community exhibits as the Arizona State Fair, this progressive firm uses newspaper advertising throughout the area served, beverage, grocery and restaurant trade journals, as well as NBC and CBS radio stations.

G. V. Smathers, retail sales manager and D. Howard Green, vice-president of Crystal Ice & Cold Storage Co. look over miniature model of exhibit booth. This model contained scale replicas of ice appliances sold by the firm.

Canadian Ice Shortage

FOR the first time in at least 30 years the 1,000-mile course of the St. Lawrence River was free from ice at the year-end, but dealers do not believe that a bad ice shortage is in the offing for next summer. A survey of dealers showed they were not worried about the situation. The worst that could happen, some said, would be a slight increase in the price of ice.

Ice dealers admitted they had not an ounce of river ice stored away as yet. They said a very small quantity had been cut from the Lachine Canal but this was negligible when compared with the demand. Their reply to customers is that last year at this time the siuation was roughly the same, one dealer said. They agreed, however, that signs of a bumper crop are few (in a normal year, the average dealer has 10,000 tons of ice stored away at this time), but scoffed at rumors of a "bad" shortage.

Railroad Plans New Car Icing Plant

THE New York Central System during the coming year will spend more than a million dollars on the Rochester stretch of the West Shore Railroad to speed perishable freight movement to the East. Major development in the program will be the construction at Waynesport of a 40-car icing plant. This facility, it was reported, will allow the Central to dispense with icing of cars at Gardenville, East Buffalo and Suspension Bridge, and again at Selkirk, south of Albany.

Gorrie Stamp Proposed in Senate

THE issuance of a commemorative stamp honoring the inventor of mechanical refrigeration, the late John Gorrie of Apalachicola, Fla., has been urged by Senator Holland. Postmaster General Jesse M. Donaldson was asked to approve the issuance of the stamp next year, the 150th anniversary of the first patent covering mechanical refrigeration obtained by Dr. Gorrie.

Crawfordsville Ice Plant Sold

THE Crawfordsville Ice & Cold Storage Co. of Crawfordsville, Ind. has been purchased by Polar Ice & Fuel Co. of Indianapolis. The plant was formerly the property of the late W. K. (Uncle Billy) Martin and the recent transaction was the first transfer of ownership since the business was founded. The plant will be managed by Oscar Robinson who for many years was a dealer for Polar Ice & Fuel Co.

Reports From Unit Ice Associations

California Association of Ice Industries, Annual Meeting

THE 30th annual meeting of the California Association of Ice Industries was held at The Fairmont Hotel, San Francisco, December 12 and 13, 1949. There was a good attendance at all business sessions and entertainment events. There were some 225 individuals registered, but this was augmented by the attendance of some 50 to 75 route men invited to the two afternoon sessions.

Opening Session

The convention opened Monday morning under the direction of President Arthur M. Stoker, who remarked that the good attendance present was evidence of a solidified ice industry. The address of welcome was given by Val King, representing the Mayor of San Francisco.

Wm. T. Jobe, general counsel of the National Association of Ice Industries, pointing out the decrease of about 12 per cent in ice tonnage over last year, said that about 9 per cent of this could be charged to weather conditions and the balance to new mechanical refrigerators and other competition. As a means of meeting this situation he suggested a realization by all that a natural slump from the good war years is inevitable. What is needed now, he said, is more effective industry cooperation and merchandising and more attention to the role of government in business. He then discussed in some detail the applications of national legislation, including the Wage-Hour law.

The status of public relations in the ice industry was discussed by Guy W. Jacobs, director of the Public Relations Department of the National Association. Reviewing past accomplishments, he said a similar program will be carried through in 1950, the volume depending upon the amount of money available. It will include magazine advertising with full color pictures, advertising in the commercial field, and other advertising and publicity services that were provided in the 1949 campaign.

Brief talks were made by representatives of refrigerator and equipment manufacturers, calling attention to new equipment and material designed to help their customers do a better selling job.

Memorial Service

Monday afternoon a memorial service was held in memory of Leon A. Bailey, former executive manager whose death occurred November 2. Eulogies for the occasion were offered by representatives of the industries Mr. Bailey served so well during his many active years of service: I. S. Culver, representing the California Warehousemen's Association; F. O. Cooke, representing the Pacific States Cold Storage Warehousemen's Association; R. J. Bailey, representing the California Association of Ice Industries. Benediction was delivered by the Rev. Bernard M. Lovgren.

Second Session

The second session of the convention opened with a panel discussion on merchandising, conducted by L. C. Francis of Stockton, assisted by Glenn Allen, Sacramento; Wally Ehlers, Oakland; A. F. Flowers, Los Angeles and James M. Reed, San Francisco. In this discussion one of the points emphasized was the importance of the research work being done by the National Ice Association to develop new markets for ice and to increase the use of ice in old markets. As a means of increasing the sale and use of domestic and commercial refrigerators, new rental plans were described which had resulted in the accelerated placing of both domestic and commercial refrigerators in the homes and business places of users.

Another interesting topic brought up in this discussion was that of poultry icing. This use of ice, it was pointed out, is creating a vast market for the sale of ice not only for the display of freshly killed poultry but also for slaughtering and shipping. Another phase of the discussion covered the icing of vegetable cases and this too had made considerable progress in increased uses of such cases in food stores.

R. J. Bailey of Union Ice Co., San Francisco, gave an inspiring talk on conditions and problems in the ice industry. Speaking of the inroads of mechanical refrigerator competition and the steps that had been taken to meet this situation, he reminded his audience, that every year brings new problems. The same kind of determination, ability and energy that doubled the ice tonnage in the United States during the period that electric refrigeration was establishing itself, will be responsible for meeting the answers to the problems of today and the future, he said. Among the things he listed as requiring the attention of members of the ice industry today are equipment sales, sales training, sanitation, employee relations.

An innovation was presented in the form of a dramatic skit, "What! Is this a Carrot? produced by R. W. Davis and H. C. Epperson of the Union Ice Co., San Francisco. In the skit Mr. Vishinsky, a typical produce retailer, was sold on the advantages of icing his vegetable counter by an ice salesman.

Officers for 1950

President, W. F. Asbury, Phoenix, Ariz.

Vice-presidents, V. V. Ogburn, San Francisco; M. W. Young, San Francisco; Mark English, Pasadena

Treasurer, R. J. Bailey, San Francisco

Secretary-Manager, Jack L. Dawson, San Francisco

Third Session

E. F. Condon, recently elected first vice-president of the National Association of Ice Industries reported on the highlights of the National Ice Convention held in New York City last November. The program of that convention, he said, was planned to discount the more or less natural pessimism created by decrease in tonnage sales from last year, and he thought it had accomplished that purpose. Elaborating on the work the Association is doing for the ice industry, he commented on the vast amount of information and help that is available to every member of the ice industry which is being provided through the effective work of the Research and Engineering and the Personnel Training and Marketing Departments, the Ice Marketing Institute, the Legal Department and the Administrative Department. These services include research programs, personnel training, providing legal information, and the administration which combines and places this service where it will be the most easily available to all members of the ice industry in all parts of the country.

J. C. Rear of Union Ice Co., San Francisco, talked about the new uses and ways of handling ice, including its use in beverages and methods of sanitary handling. The sized ice and cube ice business of his company, he said, probably amounts to 10 per cent or more of the dollar volume and all this has been developed within a comparatively few years. In this connection, he suggested that the ice machinery people also had a duty and opportunity of providing equipment and machinery adapted to meeting the needs of the present-day ice business.

The new individual ice-making machine, he said, has provided drastic competition. Analyzing some of the sales literature of this equipment, Mr. Rear came up with the suggestion that the only way to meet this competition is for the ice industry to conduct a survey, and upon the results base advertising and merchandising campaigns showing that the ice industry has a valuable service through the furnishing of sanitary processed ice and ice cubes at a moderate price. The best way to hold this business, he said, is to keep customers satisfied.

A panel discussion was presented, giving the viewpoint of commercial ice customers represented by a caterer, a restaurant operator, secretary to a restaurant association, and manager of a food store conducted by K. J. Sartori, National Ice & Cold Storage Co., San Francisco; assisted by Ivan Branson, San Francisco; Frank Martinelli, San Francisco, Malcolm Stewart, District Manager, Northern California, Manning's Inc.; Marvin M. Tudder, San Jose.

Points brought out in this discussion covered the necessity of delivering clean ice and the ways in which attractiveness of food can be enhanced with the use of ice. Another point made was that the greatest thing the ice industry has to sell the food business is that of service. This includes availability—when and where needed and in the form needed. In the restaurant business particularly much ice is used for display purposes.

Mr. Tudder, talking on the use of ice for produce said, in his company's three food stores are fifteen 8 ft. vegetable counters doing a business of one-half million dollars each year. He said the grocery business, as a whole, needs many more ice cases. He also emphasized the necessity of being able to get ice when it was needed. Contributed by a member of the ice industry, it was suggested that paper bags for both sized and cubed ice would provide the answer to the sanitation problem.

Final Session

The final session Tuesday afternoon was opened with a panel discussion on Personnel Training and Service conducted by L. D. Sommerville, Peoples Ice & Cold Storage Co., Long Beach, Calif., assisted by John W. Elwood, United Parcel Service, San Francisco; Carl J. Finn, San Francisco Division, the Pacific Telephone & Telegraph Co., San Francisco; R. M. McKee, Continental Baking Co., San Francisco; L. W. Smith, Borden's Dairy Delivery Co., San Francisco.

This discussion covered principally the methods used in training and developing the delivery personnel employed by a parcel and delivery service, telephone company employees, employees of a baking company, and delivery personnel of a dairy company. In each case the actual work of a new employee is proceeded by preliminary training covering an outline on the company's history and policies, explanation of their new duties and the importance of rendering courteous and effective service. In these training programs, use is made of training films and manuals of instruction. These preliminary training periods are followed up with additional meetings and instructions on providing service to customers.

An inspiring talk on "Meeting the Challenge in the Ice Industry and American Democracy" was presented by Joseph L. Gabriel, Hollister Ice Co., Hollister, Calif. Mr. Gabriel said that members of the ice industry have a personal responsibility for the welfare of their country and through their vocations they must not shirk their responsibilities as loyal and faithful citizens. They can meet this challenge as individuals by rendering greater service than ever before to the welfare of their community by helping to make it a better place in which to live. Democracy, he said, is like a clock—it runs down unless every generation keeps it wound up. On a more realistic basis, he said problems between competitors can be solved across the conference table with friendliness and mutual understanding and it pays to go along with competitors from the standpoint of the almighty dollar and from the standpoint of happiness to all. Both labor and management, he said, must be made to recognize their responsibilities to the people and the government of America.

Dawson Elected New Executive Manager of California Associations

THE election of Jack L. Dawson as executive manager, replacing L. A. Bailey whose death occurred November 2, has been announced by the California Association of Ice Industries and other associations formerly directed by Mr. Bailey. Mr. Dawson had been administrative assistant for the past two and a half years.

Jack L. Dawson

These associations include the California Warehousemens Association, the Los Angeles Warehousemens Association, the Pacific States Cold Storage Warehouse Association, the Warehousemens Association of the Port of San Francisco and agent for the California Warehousemens Traffic Bureau.

Mr. Dawson was born in El Paso, Tex. and came to California in 1924 where he received his secondary and college education education in Berkley, Calif. From 1938 to September 10, 1947, he was employed by the California Public Utilities Commission as a transportation rate expert, except for three and a half years service as an officer in the Army Transportation Corps during World War II. In this position he was engaged in the handling of rate and regulatory matters involving operations of rail and truck carriers as well as those of warehousemen.

Prior to his service with the Public Utilities Commission, he was employed three years with the Pacific Freight Traffic Bureau, a rail and tariff publishing agency. His basic experience in the rate and transportation field was gained through employment with a rail and steamship company.

Michigan Ice Industries Association

By Edward W. Jackson, *Secretary*

THE 33rd annual convention of the Michigan Ice Industries Association will be held at the Morton Hotel, Grand Rapids, Mich., March 2-3, 1950. An interesting and attractive program of discussions and questions relative to all phases of the ice industry will be presented. It is promised that the annual banquet and entertainment will be better than ever.

William Campbell, former secretary of the Association, has resigned because of pressure of other duties and Edward W. Jackson has been appointed to carry on the work.

Missouri Ice Manufacturers Association Annual Meeting

By V. A. ESPHORST, Secretary

THE 25th annual convention of the Missouri Ice Manufacturers Association was held at the Hotel President, Kansas City, Mo., January 9-11. Those in attendance were rewarded with an outstanding business program. The banquet and floor show arranged by Harold Margolin, chairman of the Entertainment Committee, was the best in the history of the association. Everyone present had words of praise for this show.

The following speeches given at the convention sessions were well received by those in attendance: "Seasoned Progress" by M. J. Garvey, Jr., St. Joseph, Mo., "Rich Pay Dirt in Your Own Yard" by L. L. Swartz, Indianapolis, Ind.; "Don't You Know—A War Is Over" by Karl V. Pflanz, Belleville, Ill.; "Comments on Association Work" by Walter H. Rathert, St. Louis, Mo.; "Industry Need for Advertising and Publicity" by Guy W. Jacobs, National Association of Ice Industries; "Use of Ice in Preservation of Sweet Corn and Other Vegetables" by Robert T. Thornburg, Commissioner, Missouri Department of Agriculture, Jefferson City, Mo.; "A New Market for Mountains of Ice—Poultry" by R. C. Miller, Swift & Co., Des Moines, Iowa; "Management Needs Sales—Sales Need Management" by Daniel A. Prager, National Association of Ice Industries; "Government of the People" by T. J. Krauss, St. Louis, Mo.; and "New Wage-Hour Law Amendments" by W. W. King, U. S. Department of Labor, Kansas City, Mo. The U. S. Department of Interior film "Retailing Fish" was shown.

Officers and directors were elected as follows: President, J. R. Dean, Cape Girardeau, Mo.; Honorary President, J. L. Rowland, Fayete, Mo; Vice-President, Harold Margolin, Kansas City, Mo.; Secretary-Treasurer, V. A. Esphorst, St. Louis, Mo.; Directors: Richard C. Muckerman, St. Louis; M. J. Garvey Jr., St. Joseph; Alvin D. Hatten, Independence.

South Carolina Ice Manufacturers Annual Convention

THE annual convention of the South Carolina Ice Manufacturers' Association was held at Columbia, S. C., December 5 and 6, with an interesting program of reports and addresses. The welcome address was delivered by W. S. Reamer, Jr., president of the Columbia Chamber of Commerce.

Among those on the program were Fred Mayor of the International Harvester Co., Charlotte, N. C.; William T. Jobe and Dan Prager of the National Association of Ice Industries; Mike Conklin, Southern Ice Co., Charleston, S. C.; Lieut. Calvin Hembree, traffic division Columbia Police Department. Allen H. Newcomb of Columbia spoke at a luncheon meeting held the first day.

The annual banquet and dance was held Monday evening, December 5, at which the principal address was delivered by James Sheppard.

Officers and directors for 1950 were elected as follows:

President, W. S. Reamer, Jr., Columbia, S. C.

Vice-president, E. L. Lowie, Newberry, S. C.

Secretary, George English, Columbia, S. C.

Treasurer, Ed. Gladden, Columbia, S. C.

Directors: W. R. Crossfield, Greenville; John McKinnell, Florence; M. A. Hansen, Greenwood; John T. Langston, Darlington; Dave Cullen, Denmark; J. B. Mahoney, Charleston; E. H. Moses, Sumter; R. V. Sisk, Spartanburg; and Henry M. Da Vega, Jr., of Columbia.

Illinois Association of Ice Industries

By WM. D. WRIGHT, Secretary

ILLINOIS ice men report the usual lull after the holidays, and the usual first of the year duties of the plant managers in getting the figures together for 1949. The next activity will center around the extension course of the National Ice Marketing Institute. We feel there will be a generous response to this work because of the need of the industry for trained personnel.

Business conditions are about as they have been the last quarter of 1949. Those engaged in the retail coal business are very much disturbed by the actions of John L. Lewis in keeping the miners out of the mines, coal out of the hands of the retailers and eventually, coal out of the homes of those who use coal for fuel. It is very difficult to ration the small supply available and many customers are being lost to competing types of fuel, all of which is disastrous to the solid fuel merchant and imposes a condition over which he has no control and no basis for relief.

California Association of Ice Industries

By JACK L. DAWSON, Executive Manager

IT IS the general consensus that the ice industry of California enjoyed a very favorable year during 1949. While ice tonnage was somewhat off during this period over the preceding year, this was due entirely to abnormal weather conditions which are not expected to be prevalent during the year 1950. On the other hand equipment sales during 1949 were considerably higher than in the preceding year.

With the aid of our present active and realistic merchandising program, assisted by merchandising forum meetings throughout the state, it is expected that 1950 sales both as to equipment and ice will exceed appreciably those of 1949. Again this year it appears that the industry will stress the merchandising of cubed and sized ice and ice appliances, particularly vegetable display cases.

Kansas Association of Ice Industries

By C. A. BERKIHISER, Secretary

THE Kansas Merchandising Forum of the Kansas Association of Ice Industries held a meeting in Newton, Kansas, December 8, 1949. A very good attendance was present from over the state. Some of the topics discussed were merchandising, ice-using appliances, promotional ideas and the new Wage-Hour Law.

The annual convention of the Kansas Association will be held March 27-28 at the Allis Hotel, Wichita. Everything indicates that this will be a very good meeting with a lot of ideas and suggestions for better business.

Mrs. Croft New Canadian Secretary

THE Canadian Association of Ice Industries announces the recent resignation of Kenneth C. McCrea as executive secretary, and the appointment of Mrs. Mildred E. Croft to fill the position. Mr. McCrea held this office for 13 years. Expansion of his business interests in Niagara Falls, Canada necessitated his relinquishing this work, but he will continue as a director of the association. The association office has been moved to 378 Eglinton Ave., East, Toronto, Ontario, Canada. Mrs. Coft assumes the position with a valuable background of experience, having served as assistant secretary before the war, and during the war years while Mr. McCrea was engaged in war work.

The Practical Refrigerating Engineer

Reg. U. S. Patent Office

OPERATING • MAINTENANCE • NEWS
QUESTIONS AND ANSWERS

National Association
Practical
Refrigerating Engineers

PRESIDENT
E. T. QUINN
Los Angeles, Calif.

SECRETARY
EMERSON A. BRANDT

Executive Offices:
435 North Waller Ave.
Chicago 44, Ill.

Practical Aspects of Food Freezing

By A. R. Carlson
Chief Engineer, Railways Ice Co.
Chicago

MANY cold storage operators during the past few years have been approached by people in either the canning business or frozen food packers in regard to setting up a packing plant at or near their cold storage facility to process and freeze foods for the commercial market. At first glance this seems to be a very attractive offer and an opportunity to sell refrigeration for freezing and also to keep our freezer storages well occupied with the products frozen at the plant. This relieves the packer of setting up his own freezing plant and the hiring of qualified men to operate it. Generally, if the requirements to handle this type of business are understood by both parties, it does make an attractive proposition, and the purpose of this paper is to reveal some of the responsibilities the cold storage operator must assume.

Ordinarily the packer will furnish the building, the processing equipment necessary and ground adjacent to the cold storage plant. The minimum size building to process one to two tons of product per hour is approximately 100 feet x 250 feet. This gives the operator ample working room and enables him to put his operation on a straight-line production basis.

The building must be planned with the cold storage operator to be sure that ample additional space is allotted for receiving the raw product and also disposing of the culls, shells, etc. Actually in handling some products only approximately 40 per cent by weight comes out in a finished product; 60 per cent must be removed from the plant. The trucks delivering the raw product and those removing the culls should not interfere with trucks and railroad cars handling product in and out of your commercial storage. This building should be well planned from a handling standpoint, and an additional factor of expansion of the processing room must be considered.

Processing Equipment

Processing equipment, usually furnished by the processor, consists of many items dependent on the pack, which includes viners, cleaners, washers, graders, picking tables, blancher, corn husker, corn cutters, bean grader and snipper, carton fillers, weighing table and wrapping machines. Many times these machines are set by the plant men and installed so they can be removed with another unit put in its place when the pack changes.

Continuing in the processing room, consideration must be given to power, water and steam. Power requirements in the processing room for a 1-2 ton per hour plant will approach 50 hp. generally at either 220 or 440 volts. The plant operator generally furnishes this and bills the purchaser, and must check into his transformer capacity to be sure he will not have an additional investment in these units. Standard practice is to figure one horse power per kva and then this electrical system can be overloaded by 40 per cent for any 4-hour period. This gives some leeway to take care of intermittent motor loads.

Water requirements in the processing room for washing and cooling the product after blanching vary with the product and type of blanching, but I believe a good estimating figure is about 3000 gallons per ton of product handled. Using evaporative cooling will reduce this figure considerably, but it requires approximately 5000 c.f.m. in the cooling chamber to cool 2000 pounds per hour. Steam requirements also vary in different plants, but a good estimating figure is 400 pounds per hour per 2000 pounds of product.

Most of the above factors are incidental to the cold storage operator and in some cases he does not have to consider them at all as the above facilities are purchased by the processor direct from a power or water company, but we now come to the freezing and refrigeration required, which is his direct responsibility.

Freezing Equipment

The relative values of the different types of freezers will not be discussed in this paper as they have been handled by speakers much more qualified than I am at previous meetings. The three most commonly used freezers, namely, the plate type, belt type, and air cell type, in my opinion all give a satisfactory freezing job. If properly designed to handle the product, they will freeze the product to a core temperature of 0 F. in the required time. The minimum time required is approximately 3 hours for a 12-oz. package, 4½ hours for a 2½-pound package, 6 hours for a 5-pound package, and 18 hours for a 30-pound package.

From the point of view of the operator of a cold storage plant, when it is our responsibility to furnish the freezer

Presented at the 40th Annual Convention, NAPRE.

units as well as the refrigeration, we choose the air cell type of freezer. This is done for several reasons, but principally because the handling cost is considerably cheaper than the other types. Packages are loaded on trays and slid into angle iron racks at the wrapping machines, picked up by the fork lift truck and set in the air cell for freezing. This eliminates handling trays separately as is necessary in the plate freezers. This type of freezer will also handle any type or size of package and will handle meats, poultry, can eggs, or any of the other products generally handled in a commercial cold storage plant.

Design of an air cell for food freezing is the most important function the refrigeration man has in the initial job. If this does the work properly, he generally sits back and becomes a production man, but if not, he has more trouble than he can handle from the production departments. We must realize because of the investment required we can not put in any more freezing cells than required, but also we can not have a hundred women sitting around smoking cigarettes and talking while they wait for a batch to be frozen. We have determined it requires 2 to 3 square feet of surface and 6 to 8 cubic feet of air per minute per square foot of pipe surface to freeze a pound of product per hour. With these figures the problem should be simple, but I think most of us have learned by now to use piping ratios just as a check, and design each evaporator separately. This is particularly true in a freezer cell as the space and air velocity limitations must also be considered.

Probably less thought has been given to the evaporator than any portion of the system by some designers who may forget that this is the place where efficiency begins, which pays off at your prime mover. Time will not allow us to go into design of evaporators, but some points vital to their design should be passed over lightly. We must determine our maximum load from the processor because to obtain a good efficient operation the evaporator must be steady, or in other words the process of evaporation stable. With the factor determined we can calculate our static head and properly design a low head type evaporator with the proper velocities at the headers and at the surface of release.

Design details of a low head type of evaporator would require too much time in a paper of this type, but much of your heat transfer is dependent on the wet or dry surface on the inside of the pipe, and in this type of evaporator liquid circulation will vary from 40 to 70 per cent dependent on the type of work done. Keeping these things in mind and considering that up to 6000 square feet of pipe surface per ton is required in a space of approximately 4 feet, it is easily seen why each unit is a complete design problem. Some of these evaporators are placed above the load with fans at one end and a removable baffle between the coils and the load. This allows the operator to use it as a blast freezer for sharp freezing vegetables, and by shutting down the fan and removing the baffles the room can be used to freeze meats, hams and bellies for the larger packers who find this type of freezing satisfactory in lieu of the common shelf coils which they ordinarily request.

Air Circulation

Cells are ordinarily designed to hold a ton of product of the 12-oz. package. The buggies used vary in design but ordinarily they hold approximately 500 pounds of these packages. They then hold 700 pounds of 2½-pound and 1000 pounds of 30-pound packages. Ordinarily a cell requires two 15000-cfm fans with 1-in. static. Tests have shown the resistance in a cell with four trucks is equal to approximately ¼-in. of water and the rest of the system is equal to ¼-in. Air velocities must be maintained over the product to hold the freezing time. The maximum velocity over wrapped packages is 900 feet per minute as any higher velocity tends to take the wrapping off. Velocity over the coils should be maintained at 1500-1700 feet per minute.

Ordinarily the fans discharge over the load through a duct then down through the load and back through the wall bunker. This type of bunker is generally chosen from a cost standpoint as no expensive supports are required to support the coils above the load. Size and fan pressures are very important as can be shown in the following table of test made on 12-oz. packages with -20 F. air with various air velocities.

Air Velocity Ft. per Min.	Time of Freezing Hours
50	9
100	7
200	5
400	3
800	2

The load calculation is simple. Assuming we receive the product from the blancher at 70 F., we have a load of:

70 — 26	— 44 Btu.
Latent heat	— 144 Btu.
26 — 0 × .5	— 13 Btu.
Package	— 4 Btu.
	205 Btu. per lb. frozen

Then to freeze one ton per hour $\frac{205 \times 2000}{12000}$ = 34 tons of refrigeration

In other words, it requires about 34 tons of refrigeration to freeze one ton of product per hour. This is, of course, applicable to both the freezer coils and the compressor system, and I have placed it between the two for that reason. Ordinarily a booster compressor is installed, and due to the intercooler the additional load on the second stage is 15 per cent greater than this, or approximately 39 tons.

The compressor side of the cycle is the second important problem of the refrigerating engineer. Having determined the load for his evaporator, he must now pick a compressor, water intercooler, liquid intercooler, and sometimes a second stage machine to fit in with the present plant equipment. Knowing your load this would seem simple, but the choice of the booster compressor should be made with great care because experience has shown that some manufacturers sell boosters that have insufficient valve area which can not be corrected easily after installation. I have seen cases where the gas picked up 100 degrees of superheat in the compressor, which must be removed in the intercoolers.

Manufacturers sell Freon compressors as ammonia boosters, sometimes changing the valves, but have only one wiper ring on the piston. Now the oil is supposed to flow with the Freon although I don't know why, as on all our jobs we do everything to stop it but we don't like it cutting down our heat transfer on ammonia heat exchangers. Also during the last few years second-hand air compressors have been used as boosters. These do a good job but due to lack of safety heads are not practical. Personally I feel the reciprocating machines are a thing of the past as booster machines and the future will see the rotary gaining more prominence in this field.

This type of machine does a fine job as a booster where the intermediate pressure is about constant. There are no valves, pistons, rings or rod bearings to cause trouble. Many of these machines have now operated several years with practically no maintenance. This machine had two strikes against it in the ammonia field. As we all remember the booster machine of this type put out around 1927,

that had an efficiency of about 60 per cent, but prior to the war vane material was developed that brought the efficiency of the rotary comparable with the reciprocating machine, and this efficiency increases with use instead of decreasing, as is common in the reciprocating machine.

Intercooler selection is another important step in the efficient operation of a booster system. As much of the heat of compression as possible should be removed with water. This is done in several ways, dependent principally on existing equipment. Any of the common heat exchangers are satisfactory, such as the shell and tube cooler, or atmospheric condenser. One unit that operates very efficiently and uses very little water is the evaporative air after-cooler when used as an intercooler. This is a package unit easy to install and does a fine job with little or no maintenance.

The liquid intercooler is generaly a large drum with a float controlling the liquid level through which the gas passes to lower its temperature to the saturation point. This as a general rule is no installation problem, but it is important to be sure it is big enough to handle the job. Generally it is good practice to order this unit to handle twice the initial load to take care of any future expansion. In some cases this unit can be eliminated and the gas is put through a large accumulator from the ice tanks or cold storage rooms that are flooded.

The second stage machines are generally already available in an existing plant, but the engineer must be sure he has ample capacity, and by taking the additional freezing load he is not penalizing another portion of the operation.

Other Responsibilities

The cold storage operator generally takes additional responsibilities, such as maintaining records of blancher temperature, time of blanch, temperature of cooling water, time of freezing, temperature of sample case after freezing, and storage temperature. He is also rsponsible for the plant sanitation and must keep the premises and equipment clean. This is not the same meaning of the word, "cleanliness," as is commonly thought of in a plant, because I know we all try to keep our plants as clean as possible, but now every time you turn around someone is taking a bacteria count where it is least expected.

Most vegetables come out of the blancher with a bacteria count that runs approximately 12,000, and this same product will pick up to a count of about 40,000 going over the belts, wrapping machine, etc. If this goes to 50,000 something must be done because it is then considered a poor product. All equipment must be sterilized several times a day and some plants continually sterilize belts from the underside.

Storage temperature of frozen foods must be held at 0 F. or lower, and all records of the product, when frozen, when received into storage must be kept by the warehouseman. These records of lots must be kept accurately and the lots segregated for easy removal.

Shipping cases when not handled by pallets should never be placed on the floor but laid on dunnage about 4 inches above the floor. This is to allow air circulation and is usually placed at right angles to the coils. In piling stripping laths should be placed between every other case. When defrosting cases must be protected from frost falling on them through the use of tarpaulins.

When shipping frozen foods from the warehouse the operator should be sure the walls and insulation of the car are all cooled down before the product is loaded into the car. Cars should be ordered in advance so they can be precooled. No product should be loaded out unless it has been at least 48 hours in storage so that the packing cases have had ample time to cool down to a temperature of 0 F.

N.A.P.R.E. Question Box

NOTE: H. G. Venemann, Chairman of the Educational Committee, has agreed to answer through this column all questions asked by members of the N.A.P.R.E. Please send your questions to him care of Purdue University, West Lafayette, Ind.

Relative Humidity Problem

Question No. 835: We have a refrigerated storage room 80 by 48 by 11 ft. high with 4 in. corkboard insulation all around and a single 4 by 6 ft. 6 in. door. The room is refrigerated by ceiling coils of 2 in. pipe 2000 ft. long with drip pans underneath. Brine at 15 to 18 F. is circulated through the coils to maintain the room at 35 to 38 F.

Stored in the room are nuts, dried fruits, popcorn and similar items. It is desired to hold the relative humidity in the room at about 50 per cent but it usually runs up around 90 per cent. What is wrong at present and how can the room be made to hold the desired relative humidity?—C.C.P.

ANSWER: Air at a dry bulb temperature of 35 F and a relative humidity of 50 per cent has a dew point (condensing) temperature of 19.5 F, and contains about 14.8 grains of water vapor per pound of dry air. Air at 35 F and a relative humidity of 90 per cent has a dew point temperature of 32.5 F and contains 26.8 grains of water vapor per pound of dry air. Your problem is to get rid of 12 additional grains of moisture per pound of air either before or after it enters the room. This could be done by building an ante room around the main door and using a dry or wet coil diffuser. If the dry coil type is used it would have to be defrosted frequently. If the brine spray or glycol diffuser is used, provision must be made to maintain the proper density of the brine or glycol.

You may be able to dry out the air with your present coil system. I cannot say because you do not give sufficient information about its performance at present.

A colder brine at higher velocity through a part of your coils will maintain a lower relative humidity than brine at 15 F through all of your coils, if its velocity is being held back by your control valves.

At present the brine may be entering the coils at 15 F but leaving at 33 F, in which case its average temperature in the coil is 24 F. This might be cold enough to hold the room down to 35 F, but it would not be cold enough to condense out the water vapor in the air. Under this situation you do not dare to open the brine valves and let the brine flow through all of the coils freely for fear of getting the room too cold. But if you had only part of the coils in use and would let the brine flow through with only 2 degrees temperature difference between inlet and outlet, it would have an average temperature of 16 F, which would reduce the relative humidity in the room. For a relative humidity of 50 per cent you would probably require a brine temperature below 10 F.

As stated above I cannot tell you whether you will be able to statisfy your desires with your present coil system, but I have attempted to give you an idea as to how to find out.—H.G.V.

Pressure from Liquid Expansion

Question No. 836: A closed steel shell of 18 inch diameter and 60 inches long is filled with water at 68 F. and 30 lb. gage pressure. What will the pressure rise to if the temperature of the water is increased to 203 F.?—J.W.B.

ANSWER: This problem may be solved if we assume that the tank will expand by reason of the increase in temperature, but not by reason of the increase in pressure. This accepts the principle that nothing can prevent the tank from becoming larger when its temperature is raised, and

the principle that the tank could be of heavy enough material or could be braced to withstand an enormous pressure without bulging or otherwise expanding.

To solve this problem we proceed as follows:

(1) Determine volume of tank at 68 degrees F.

(2) Determine volume of tank at 203 degrees F.

(3) Determine pounds of water in tank at 68 F.

(4) Determine specific volume of water in tank at 203 F, in cubic feet per pound.

(5) Determine change in specific volume of water in tank at 203 F to hold the same weight as at 69 F.

(6) Knowing the compressibility of water at 203 F, compute the pressure required to compress it to the volume of the tank at 203 F.

SOLUTION:

(1) The volume of the tank at 68 F=8.83575 cu. ft.

(2) The volume of the tank at 203 F=8.85664 cu. ft.

This is based upon the lineal expansion of steel at 0.000006 feet per degree for each foot of length. At 203 F the new diameter will be 1.50121 feet and the new length, 5.00405 feet.

(3) The tank will hold 550.5 pounds of water at 68 F. (Sp. vol. of 68 F water is 0.01605 cu. ft. per lb.)

(4) The specific volume of 550.5 pounds of water in a tank at 203 F is equal to 8.85664 divided by 550.5, which gives us 0.016088 cu. ft. per lb.

(5) Water at low pressure and 203 F. has a specific volume of 0.016655 cu. ft. per lb. Therefore each pound of water in the tank at 203 F must be compressed by pressure or reduced in specific volume by an amount equal to the difference between 0.016655 and 0.016088, which gives us 0.000567 cu. ft. per lb.

(6) Keenan and Keye's Steam Tables, Table 4, states that for every thousand pounds per square inch of pressure applied to a pound of 203 degree water it will be compressed approximately 0.000051 cubic feet. Therefore if we must compress each pound of water an amount equal to 0.000567 cu. ft. we must apply a pressure of

$$\frac{0.000567 \times 1000}{.00051} = 11{,}117 \text{ lb. per sq. in.}$$

Another way to look at this problem is to figure that the tank at the original temperature holds 550.5 pounds of water, whereas when tank and water are at 203 F it will hold only 531.8 pounds at low pressure. This means that 18.7 pounds of water must either escape from the tank or be compressed into the 8.85664 cubic foot tank. This is not a very practical problem for evidently it would be a very unusual tank that would hold a pressure of 11,117 pounds per square inch.—H.G.V.

Beam and Column Insulation

Question No. 837: Where steel beams of columns project from a cold room through the insulation it is customary to insulate these beams for some distance out into the room. Is there any specific guide to follow in the extent of this insulation? For example in a room held at -5F. the insulation on the walls is 6 in. thick. A 12 in. I beam extends through the insulation into the brick wall behind it. What thickness of insulation should be supplied to the I beam and how far out should it extend?—L.P.C.

ANSWER: I will estimate the heat loss through the wall with no insulation around the I beam and let you decide whether it will pay to insulate it.

The heat which enters the external surface of the I beam must come from the brick and cork surrounding it, and all of this heat must be carried into the room through the web or cross-sectional area of the beam, which in this case is 11 square inches or 11/144 square feet.

The maximum heat flow will be produced if the temperature gradient of the imbedded beam equals that of the brick and cork. Assuming a normal 13 inch brick wall with 6 inch cork insulation, with an outside air temperature of 95 F and an inside air temperature of -5 F, we would calculate a surface temperature of the brick to be 93.3 F and a surface temperature of the inside wall to be -2.5 F. If we further assume that one foot of the I beam is imbedded in the brick and 6 inches in the cork, we find that the heat flow into the room will be

$$Q = \frac{26(94.3 + 2.5)\ 11}{1.5 \times 144} = 128 \text{ Btu per hour}$$

In the above formula 26 is the conductivity "K" of steel in Btu. per hour, sq. ft., degree F.

In all probability the actual amount of heat flow will be less than 128, because the beam will not reach a terminal temperature as low as -2.5 degrees.

If the I beam were insulated thoroughly for a distance of one foot inside the room, the heat flow would be through a 2.5 length instead of 1.5 as above, and the quantity will be 77 Btu. per hour.

These answers are approximate only, yet they are on the safe side and under the conditions it would hardly pay to insulate the beam at all.—H.G.V.

New Questions

Use of Mollier Chart

Question No. 838: Can one determine the faults of a compressor by the use of the Mollier chart? How will defects in the compressor or poor performance show up on the chart?—R.M.E.

Relative Humidity Measurement

Question No. 839: I would appreciate your giving me information on the best methods for accurate determination of the relative humidity in freezer storage rooms at 0 F and below.—C.B.

Insulation on Ground Floors

Question No. 840: In earlier years many engineers would not recommend placing a freezer room carrying a temperature lower than 20 F. on a ground floor. Even though standard thickness of insulation related to the temperature was installed, experience had shown that the subsoil froze and the floor was pushed up.

Now freezer rooms are not only being erected on ground floors but also in some cases the floor on the ground is not insulated. For this reason I would appreciate expert opinion on two questions: 1. What construction methods will avoid trouble when freezer rooms with floor insulation are erected directly on the ground? 2. Under what conditions is it possible to erect a freezer room on the ground with no floor insulation so that loss of refrigeration is not excessive and no trouble ensues with floor heaving?—C.P.

Member Activities

Tacoma

By ELMER JOHNSON

The officers elected to serve Tacoma Chapter during the current year are:

President, L. E. Haase
Vice President, Clarence Mase
Secretary, C. W. E. Johnson
Sergeant-at-Arms, Joe Zini

The chairmen of commitees are: Educational, J. A. Slater; Membership, W. D. Vanderflute; Social, E. D. Branscomb.

For a number of years Otto Stolz has been chairman of our Educational Committee but because of other activities he felt it necessary to retire. The chapter wishes to express appreciation for the excellent work he has accomplished during his long term of office as head of this committee.

The educational feature presented at the meeting was a 45-minute wire recording with lantern slides on the dehydration of refrigerants by Dr. Walker O. Walker of the Ansul Chemical Co. Bob Slater secured the equipment and the program was quite interesting to all of us.

N.A.P.R.E. Department

Chicago

By E. B. Jones

The first section of the special lectures on automatic refrigerating plants by Eugene Rytlewski was concluded at the second December meeting. The maintenance methods in connection with such systems were discussed and then Mr. Rytlewski reviewed some of the highlights of the course. The second part of the course which refers to air conditioning plants will be covered in the latter half of the season.

The announcement of the Question Box Contest in the chapter has brought out enthusiasm and a number of additional questions. The activity promises to be one of the particular features of future meetings.

The subject of trouble shooting in the plant was presented in the special address by Charles Reid of the University of Illinois Research Hospital. First he cautioned that the refrigerating unit and its controls should be checked thoroughly before service work is started on the machine. This precaution is not only a protection against injury but also contributes to better results. Accurate pressure gages and instruments are a necessity if the job is to be well done.

Belting is frequently a source of trouble but most of the time washing or cleaning of the belts will remedy the difficulty. The operation of controls should not be taken for granted until they give trouble. Regular inspection and cleaning or adjustment will insure reliable operation. The electric contact points if not cleaned and maintained may stick and arc and cause trouble.

Regular cleaning of air cooled condensers is important although experience has shown that this is sometimes neglected. Frequently the water control valves applied to condensers are oversize which causes erratic operation. It was recommended that they be changed to a smaller size or a restrictor disc or air cushion should be provided.

The water should be changed regularly in spray type air washers and the interval will depend upon the contamination in the air. A cleaning program which includes the control louvres on intakes, the control bulbs and the blowers and fans was recommended by Mr. Reid. He emphasized the value of keeping a plant notebook because this leads to better attention to small items which may cause difficulty if they are neglected. He concluded with a discussion of suiting tools to the job and the maintenance of order and cleanliness.

Additional discussion of the subject was presented by S. A. Cole. He described the importance of familiarity with the equipment to be serviced and a careful analysis of the work to be done. Examples were given of how sketchy analysis can lead to error and how troubles are encountered by people who use wrong tools and wrong methods.

At the second meeting of the month the air conditioning course was launched by Mr. Rytlewski with a discussion of machine room space and layout. He said operating engineers and servicemen especially, should be interested in having adequate provisions for machinery space and layout. Otherwise care and maintenance of the equipment becomes a difficult problem. The space requirements based on natural and fan ventilation were discussed and examples were given to illustrate an adequate job. The word ventilation was underscored because it was pointed out that the temperature of the room must be held at moderate levels despite the heat output of the motor, compressor and other machinery. While motors are designed to operate at 40 to 50 degrees C (90 F) above room temperature it is better not to allow the room temperature to go too far above the ambient.

Data was given on the capacity reduction and horse power per ton when typical compressors are operated with two or more cylinders under automatic cut off. It was shown that in most cases it would be cheaper in the long run and better from an operating standpoint to employ two speed motors when capacity reduction is desired.

Specific data was given on the sizing of condensers to suit the needs of Freon systems. A caution was inserted to maintain water velocity to horizontal shell and tube condensers between a minimum of 2½ and a maximum of 8 ft. per second for best overall results. Calculations of water control valve sizes were shown because it was indicated that on many jobs the valves installed are too large and do not operate satisfactorily. Recommended velocity through the valve is 12 to 18 ft. per second.

A symposium on starting and stopping of larger compressors was led by John Neff who pointed out that much of the plant equipment is not automatic and that the older compressors and motors require special handling to avoid trouble. Except where metallic packing is employed, starting and stopping of the compressor may involve adjustment to the packing which has an important bearing on its durability and length of service.

Thomas Madsen described approved methods of starting horizontal compressors and explained how to guard against slugs of liquid which might prove damaging. Also some of the older type motors are subject to trouble if wrong methods are used.

The third participant in the discussion was Gilbert Sellers, a veteran of many years in the industry. He prefaced his discussion with the story of his experiences in refrigerating plants early in the century. He returned from several years overseas and was in San Francisco at the time of the earthquake. Later he came to Chicago and was placed in charge of operating an ice plant when he knew little or nothing about the details of operation. He learned quickly, however, and remained in that field through the succeeding years. Mr. Sellers then described vertical single acting machines including the large early models and gave details of their operation.

Los Angeles

By Fred Herr

A slate of proposed officers to fill the posts of Los Angeles Chapter NAPRE during the 1950 term, which had been recommended by the nominating committee in December, was, with one exception, installed at the January 4 meeting held in the Terminal Club.

They are, Dale Rycraft, president; George Paulick, first vice president; Donald H. Byl, secretary; E. T. Quinn, treasurer, and Joseph H. Granger, sergeant-at-arms. R. L. Maple of the Union Ice Co., who had been tabbed by the nominating committee for the post of 2nd vice president, found it necessary to withdraw. The committee thereupon recommended for that post the popular William "Bill" Losch of the Frick Co., who found himself elected so quickly and unanimously that he didn't have time to light his ever-present cigar between nomination, election and installation.

Retiring president Rudi Kettler presided over the first half of the meeting. He announced the recent passing of Paul Carnes, formerly with the Ralph E. Manns Co., who died of a heart attack in Seattle, Wash., during the latter part of December. He is survived by the widow and twin daughters.

Also announced was the news of the removal of Mortimer E. Bell, a past-president (1946) from Los Angeles to Seattle, Wash., where he has assumed the post of supervising engineer of the various Sieck breweries in the United States and Canada. Bell was formerly chief engineer for the Los Angeles Brewing Co.

Chairman Kettler directed the presentation of two final membership awards: An automatic electric toaster to Don Byl for signing the largest number of new members (26) in 1949; and an electric percolator to Elmer Johnson for the second largest number (20). To George Paulick, retiring secretary and newly elected first vice-president, the chapter presented an electric percolator in appreciation of the fine job of secretary he performed during the past year.

A review of preparations thus far made and plans under contemplation for the 1950 NAPRE convention in Los Angeles was given. It was suggested that an effort be made to ascertain definitely whether Thanksgiving Day will be officially celebrated on November 23 or 30. The chapter regards it as inexpedient to schedule the convention during the week in which the Thanksgiving holiday would interrupt the proceedings.

Mr. Losch proposed that one entire meeting night be set aside in June for general discussion of convention plans and receipt of suggestions. The proposal was approved.

The annual financial statement was read by Treasurer Quinn and approved as read. Mr. Quinn reported that the 1950 chapter membership index was under preparation and would be off the press within a month, in substantially the same format as the 1949 issue. The entire membership will be individually listed by name, address, business affiliation and home and business telephone numbers.

William R. Burnett, newly appointed chairman of the 1950 membership drive, spoke briefly on the 1949 campaign and attributed its success largely to the splendid coopera-

tion and hard work offered by his committee members. He will have the same committee under his direction for the 1950 campaign—Ralph Moore, C. C. Nordholm, Donald Byl and Frank G. Hooper. One hundred per cent membership from plants already represented in the NAPRE by one or more members is the objective, with a total chapter membership of 500 by November (convention time) the over-all goal.

When the new officers were installed with Rudi Kettler surrendering the gavel to Dale Rycraft, the retiring president was presented with a wrist watch. In accepting the gavel, Rycraft said: "I have no flowery acceptance speech prepared. All I wish to say is that I thank you for the honor you have conferred upon me and if I can do half as well up here as my predecessor, Rudi, I will consider having done a mighty good job."

The first matter which President Rycraft of the NAPRE had to act upon was a letter received from Secretary Dale Rycraft of the California Institute of Power Engineers. The CIPE sought the NAPRE's collaboration in submitting an outline of studies to the Los Angeles Board of Education for proposed evening engineering classes to be established at the Wiggins Trade School. The NAPRE was requested to recommend the refrigeration phases which ought to be incorporated in the general engineering courses, which are to be of advanced classification for graduate engineers desirous of brushing up on or familiarizing themselves with recent developments in their field.

President Rycraft named Walter Perry as chairman of a committee which is to collaborate with the CIPE in drawing up recomended study courses.

Mr. Quinn reported that progress on establishing the Blair Memorial Laboratory for refrigeration research in the Wiggins School is proceeding gratifyingly. The Board of Education, he reported, is cooperating whole-heartedly and has offered the alternative of allocating an entire floor in an existing school building or erecting a separate structure to house the expanded refrigeration classes and the Blair Memorial Laboratory.

Feature of the educational session on January 4 was an illustrated talk by Ralph Moore of the California Consumers Corporation on the methods employed by that firm in harvesting, refrigerating, packaging and shipping lima beans. Title of the talk was "Frozen Lima Beans from Pod to Package."

St. Louis

By F. G. Bishop

Our Educational program started this past fall with our member Arthur Freuler's talk on "Back Pressure Valve Application." Next we enjoyed a visit to the Anheuser Busch Brewery where our President Ken Holaday acted as host and John Carter spoke about "Present and Expected Problems in the Brewery Refrigeration Plant." This was followed by a trip through the manufacturing and fabrication departments of the Midwest Piping and Supply Co. Here our member, Fred Taylor escorted the chapter through the factory and Robert Ramsey made a brief address.

On January 16 we will meet at the David Ranken School of Mechanical Trades and hear Albert Miller speak about the Ingersoll Rand Steam Jet Machine.

Colton

By H. O. Bonter

The regular meeting of the chapter was held in the Santa Fe Ice Plant at San Bernardino. The officers who will serve the chapter during the current year are:

President, C. H. Purkiss
First Vice President, F. J. Scherer
Second Vice President, Alvie Miller
Secretary-Treasurer, H. O. Bonter
Sergeant-at-Arms, J. E. Finfrock

The directors are E. V. Berchtold, E. H. Carlson and A. S. Chantry. The Chairman of the Educational Committee is H. G. Francis.

Heating with Reversed Cycle Refrigeration was the subject of an interesting discussion presented by H. H. Douglas, industrial heating engineer for the Southern California Edison Co., who was assisted by D. D. Van Kirk, R. L. Price and J. T. Bethell of the same company. A system of this type is installed in the San Bernardino office building and several other buildings of the Edison Company and the operations have been carried on long enough to assemble extensive data on such systems. The same equipment is used both to heat the buildings during periods of low temperature and to provide comfort cooling during warm weather.

Earlier systems employed direct heating with electric, wall type heaters. At the conclusion of his address Mr. Douglas presented an extensive bulletin which includes comparisons of the two types of systems. Reversed cycle heating combined with summer cooling results in a much lower maximum demand, reduced total current consumption and a considerably increased operating load factor. As a result the cost of heating and cooling is reduced. For instance, in the San Bernardino office building an average power consumption of 64,000 kwh. per year was reduced to 46,000 when reversed cycle heating replaced direct electric heaters and the other services were maintained.

Tulsa

By Kenneith Addison, Jr.

The officers who will serve in Tulsa Chapter during 1950 are:

President, B. L. Stewart
First Vice President, Ed. K. Ellis
Second Vice President, Nate Axton
Secretary, Kenneith F. Addison, Jr.
Treasurer, Bob Palmer
Sergeant-at-Arms, Homer Girdler

The directors are G. H. Koehne and K. G. Wight.

For the first part of 1949, Tulsa Chapter had no set educational program. We enjoyed many different lectures and films dealing with everything from centrifugal compressors to Fibreglas insulation. The last half of the year was devoted specifically to plant maintenance. During this period we studied the procedure for shutting down an air conditioning plant for the winter, operation and maintenance of evaporators and condensers, slime and algae control, the reasons for a booster compressor in a refrigeration system, automatic controls and care and maintenance of electric motors.

Stockton-Modesto

By R. M. Edger

The regular meeting of the chapter was held in Modesto and we had a welding demonstration put on by Frank Williams of the Victor Equipment Co., Lodi, Calif. Mr. Williams gave us a very interesting lecture on the proper welding equipment to use for a particular job and the welding rod most suitable for each application. Then he demonstrated correct methods of welding. He also laid out pipe work showing us how to make various fittings come out cofrectly. He then demonstrated his new cutting torch that cuts brass, stainless steel and cast iron. Various members were permitted to use this new torch themselves.

It is apparent that a class of this nature has the best drawing power for our membership because we had a fine attendance at the meeting. We are all very grateful to Mr. Williams and the Victor Equipment Co. for the very fine lecture and demonstration given to us at this meeting.

The second meeting of the period was held in Stockton and new officers were elected and installed as follows:

President, L. R. Schroeder
Vice President, John Panizza
Secretary, R. M. Edger

Board of Directors, H. W. Hedburg, R. Dale Hunter and C. C. Berkley. Educational Committee, John Panizza, Chairman, Joe De Bry, Hank Enns and W. R. Greenstreet. Membership Committee, E. L. Young, Joe De Bry, J. H. Duffield, C. L. Trower, O. M. McConnell, Roy Munoz, John Bauer and D. B. Desjardin. Entertainment Committee D. B. Desjardin and Roy Ashcom.

Dallas

By D. F. Bancook, Sr.

The officers elected to serve the chapter during the current year are:

President, Warren B. Cunningham
Vice President, Jack Copeland
Secretary, John G. Walstrum

The Educational Committee consists of Elliott Hallowell, Chairman, Jim Moss and L. P. Reiss. The program for the year ahead has been arranged and we expect good results from it. In addition to the educational content several entertainment features have been planned.

The work on membership building is expected to bring good results to add to the fine start already made.

Memphis

By CHARLES CONLEY

The subject of the special discussion at the first meeting of the period was boilers and water treatments. There were two good speakers. Frank H. Lyons, one of the old time instructors of the chapter presented a typical water analysis and explained the significance of each detail in it. Then he described the correct type of treatment to prevent scale deposit from this water. Modern types of boilers, he said, bring more operating problems than the older types which usually operated at lower pressure.

The second speaker was K. E. Shreeve, field engineer for the Deady Chemical Co., who described the problems presented by several different types of boiler water and the methods used to treat them and produce satisfactory results in the boiler.

The officers elected at the following meeting are as follows:

President, Harry A. Simpson
First Vice President, C. E. Stacks
Second Vice President, Cecil W. Sullivan
Secretary-Treasurer, Charles Conley
Sergeant-at-Arms, Herbert A. Davis

Chairman of the various committees are: Alvis Clay, Educational; Douglas Smith, Entertainment; William Brooks, Safety; William Stanley, Membership, and Paul Barth, Operating Data Book.

Doug Smith acted as installation officer. He gave each officer the oath of his office and instructed him as to what his duties were; congratulated each one and told them he hoped they would all fill the office well and carry out their duties and make for the chapter a great year during 1950.

President Simpson immediately called a meeting of the officers and committee men for the following week to arrange the program for the year's activities and discuss the policy for carrying it out.

Fresno

By K. W. FINDLEY

The regular meeting of the chapter was held in the office of the Pacific Fruit Express Co. Ice Plant. Following the call to order by President Bauder the minutes of the previous meeting were read and approved. An election of officers was held and the following members were elected to hold office during the year 1950:

President, C. P. Shupe,
Vice President, L. A. Lancaster
Secretary-Treasurer, M. Pedersen
Sergeant-at-Arms, I. Lounsbury

The subject of discussion for the evening was accumulators. The sizing of accumulators to produce positive separation of liquid and gas was analyzed and it was pointed out that most designers require a gas velocity not greater than 200 ft. per minute, although some felt that 150 ft. per minute velocity through the accumulator is better.

Methods of connecting accumulators into the system and their design to obtain best results were brought out in the discussion in which a number of the members joined.

Prize for Operating Manual

THE National Board of Directors has authorized a prize of $100 to be awarded to the member or group of members who submit the best Operating Manual and have it accepted for publication by the Educational Committee. For some time the Association has desired to publish a series of plant operating manuals which would guide members to the best operating practice in their plants and assist younger engineers to develop good operating practice.

There are numerous books and publications about design of refrigerating plants but nothing of a comparable nature on plant operation. A number of articles have been published on plant operation and maintenance but none covers sufficient ground in itself to provide a complete source of information. It is expected that the operating manuals will fulfill this specific need for complete, detailed information.

The present contest will cover manuals on the operation of the following types of plants:

Air conditioning plants
Breweries
Cold storages
Dairies
Ice plants

More details on the type of information and material the manuals should include may be procured by request to the NAPRE national office.

The National Educational Committee will judge the contest and manuscripts should be postmarked not later than Nov. 1, 1950. The judgment of the committee will be final and all manuscripts submitted will become the property of the committee.

In addition to the work by individual members, it is expected that committees will be formed in chapters to work on one or more of the manuals. Beyond the fame and prize money incentives, the project provides an excellent opportunity for cooperative work of benefit to all the members.

Aluminum on Steel Coating Provides Protection Against Corrosion

A NEW aluminum-on-steel combination that gives promise of wide usage has been reported by Science Service of Washington, D. C. in its coverage of new patents. The light metal serves as a coating to protect the steel against corrosion. The government has issued patent 2,484,118 to Richard S. Reynolds, president of Reynolds Metals Co., Richmond, Va., to cover the process.

In the new method, two strips of aluminum foil are applied to top and bottom of the steel sheet. A fine iron coating is applied to the steel first by an electrolytic process to provide a permanent bond bteween the steel and aluminum surfaces. Older methods of applying aluminum to steel by dipping the steel in molten aluminum obtained an unsatisfactory bond.

The mill setup for handling the application of this coating involves in a single continuous process, passing steel strip from a coil through a cleansing bath, an electrolytic bath where it receives the iron coating, a furnace to heat it to about 850 F, then between two strips of aluminum foil which are bonded to the steel by high pressure rolling. The aluminum-covered steel can then be further rolled to reduce its thickness as desired.

Standardized Packages Avoid Waste

THE Packaging Institute, which held a three-day forum in the Hotel Commodore at New York recently, urged management's attention to packaging problems in order to cut distribution costs. One of the speakers, who presented the point of view of top management on packaging, stated that with increased freight rates, packages that weigh less and occupy less space are becoming extremely precious. He stated that containers which score high in every packaging popularity test are those designed to simplify handling with automatic equipment and which fill box cars and trucks without waste space.

Some of the items which are helping industry survive the squeeze of rising costs and falling prices are care in marking containers, packaging in convenient quantities, and packages whose dimensions fit shelves in warehouses, stores and homes. He urged that industry look into the standardization of packaging as a means of avoiding waste.

Notes on Engineering and Mechanical Equipment in Great Britain

By W. R. Woolrich[1]
Dean, College of Engineering
University of Texas, Austin

THE engineers of Great Britain are much more acquainted with our American procedures and practices in engineering than we are of theirs. Since a large percentage of their business must be done on an international basis while within the United States probably ninety per cent of our commercial activity is inter-state, there is a very definite reason why their interest should be more international than ours.

It is somewhat of a shock to the traveler that so many of their practices differ widely from ours and that even our language and customs differences are quite pronounced.

A native of Great Britain quickly recognizes an American by several observations. A highly colored necktie, a broad brimmed hat, a request for drinking water at the dinner table, or a spoken sentence will give the clue to the Britisher. "American" is recognized as a separate language from English although the differences that exist between the accents of the several British counties are greater than those existing between Brooklyn and Amarillo or Savannah and Cheyenne.

British newspapers carry a much larger percentage of American news than American papers print of British items. They are very sensitive to American press reactions.

British acquaintanceship and appraisal of the U. S. however is based very largely on what is reported from New York and Hollywood. If you will interview a sample of University students of Great Britain about the characteristics of the United States, their real knowledge of the area between the Hudson River and the Sierra Nevadas is almost nil. When they travel to the American Continent, their visit is usually confined to Boston, New York, Philadelphia and Washington. Their West Coast impressions are gained from the American films which are pro-Hollywood. What exists between the Appalachain and the Western mountain ranges receives but little recognition in the day by day thinking of the Britishers.

The people of Britain get a great kick out of the flare of the American tourist for historical places. Since there exists a considerable number of ruins that date back before Christ, then a very extensive number of castles, walls and high roads built during the four hundred year Roman period beginning B.C. 56, and a still greater multitude of cathedrals, castles, palaces and walls completed before the fifteenth century, any self appointed guide of the British Isles can entertain an American tourist with an unending array of notable items of antiquity, and a large portion of the U. S. tourists revel in all of it to the great delight of the natives. Naturally, some of the more gullible of the Americans are supplied with some historical episodes that never appear in the authenticated records of the British Isles.

Engineering Education

Engineering as defined in Great Britain differs from our U. S. usage in several respects. In the general use of the word engineering it is applied to the machine industries rather than the profession. Automobile repair shops, tractor sales agencies and small manufacturing plants are classified as "engineering works."

Some three hundred technical colleges in Great Britain train the operating and manufacturing personnel for the thousands of small industries—and a large number of these graduates of these technical colleges who hold diplomas and not degrees are classified as engineers. This differs very greatly from the Continent where an engineer is a professional designer, research investigator or consultant with many years of scientific experience and education.

The education of refrigeration engineers has followed the general plan of engineering training in Great Britain with much emphasis placed on the practical. A large number of the present day refrigeration engineers served their apprenticeships in established manufacturing plants then attended technical colleges or Universities for their fundamental education.

During the past two years a National College for Heating, Ventilating, Refrigeration and Fan Engineering has been established in London by the Ministry of Education. This College is engaging in both advanced instruction and research with a liberal financial budget. They confer certificates and diplomas on the fully trained student.

The Institute of Refrigeration of Great Britain is a most effective society of refrigeration technical and administrative brains of the British Isles. The official mouthpiece or organ of the Institute is Modern Refrigeration edited by Mr. J. Raymond.

Mechanical Equipment

May we turn now to specific procedures in the mechanical equipping of buildings under different sub-titles.

Garbage disposal—or, as the British name it, Refuse disposal: This is a major problem in the densely settled areas of Great Britain. If you can picture twenty three-story homes in a block separated only by their respective party or fire walls—each identically alike with their several chimneys constructed in the party walls, you will have the prototype of hundreds of thousands of town blocks of England, Scotland, and Wales. These homes usually have a back yard but no rear alley, thus the garbage for disposal must come to the front of the house. In some of the larger cities, it is reported that over 60 per cent of the refuse must be brought to the front door.

Incinerators have been installed in some areas following the Swedish plan of burning the refuse to supply the hot water requirements of the block residents. However, in British areas, considerable care must be exercised to prevent the burning of valued refuse such as paper and old clothing. There are strict regulations against the burning of paper in most British counties.

In some of the newer housing developments, central Garchery systems have been installed. In this a special refuse enamelled cast iron container is fitted under the kitchen sink. It is equipped with a normally closed outlet plug and an overflow. There is a five inch inlet to this basin from the sink. The refuse and sink water are passed

Presented to Memphis Chapter NAPRE

[1] Formerly Senior Scientist, Engineering, U. S. Embassy, London, England

to this container and the surplus water goes out to the sewer by the overflow pipe. When this tank is filled, it is drawn by suction to a central receiving tank in a disposal station where it is dehydrated by vacuum pump or by an extractor and the water passed on to the sewer and the solid refuse to a gas or electric incinerator.

There is considerable dispute whether the expense of obtaining refuse disposal by such a system is justified. In congested areas where people are required to live many floors above the street, the Garchery system is a great convenience to the housewife. The prevailing question is whether these housewives make effective use of the time saved to justify the investment.

Lifts (Elevators) Only a limited use is made of elevators or lifts in Great Britain. Even in hotels that boast of their lift service, it is rather expected that if you are not over five floors up, you will not insist on using the elevator except for up passage or down passage with baggage.

Britishers will tell you that one reason for the limited use of elevators goes back to Queen Victoria. During the Victorian period, most of the great building construction of London was executed and the good and weighty Queen built a large number of houses in her own name. When the question was raised whether she would have "hoists" installed in her homes, she became somewhat upset by the suggestion of having equipment installed that was normally used to elevate barrels and heavy sacks. She emphatically said she was not going to be hoisted around like a keg or a big rock, but she would walk up her staircases. And many of her homes today still afford no other lifting equipment than the human being possesses in his human anatomy. Incidently, the manufacturers of hoists decided they had selected an unfortunate name and thereafter called the elevating device a "lift" and "lift" it is today.

In stores, public buildings and underground railways, the escalator is used more extensively than within the United States. In the underground or subway system there are many escalators carrying a continuous load of commuters from one system to another—often to underground depths of 150 feet below the street level. What Britain does not supply in elevator service she makes up in escalator transfer.

In the Ministry of Works Manual, it states in regard to escalators:

"In the larger stores, where floor-to-floor traffic is particularly heavy, the installation of escalators is to be strongly recommended. The passenger-carrying capacity of one escalator is more than that of several lifts, because no time is lost in loading and unloading, opening and closing doors, and in accelerating and retarding of the lift-cars.

The prompt and easy transport facilities provided by escalators invite and promote inter-floor circulation of customers throughout a store. Moreover, the very nature of an escalator enables passengers to view merchandise whilst traveling."

Small Heating and Power Boilers

On account of the relatively mild winter climate and their deep devotion to the open fire place, central heating has experienced a retarded development in Great Britain. The central heating boiler as installed in the smaller units is generally sectional cast iron, not unlike those built in the United States. The larger steel boilers however, appear archaic to the American Engineer. The horizontal return tubular boiler common in the United States is practically unknown in Great Britain.

Probably the most commonly used horizontal type boiler for capacities of less than 180 horse power is the Lancashire boiler with its one long cylindrical shell and two fire box tubes set horizontally in brick work. The front plate is connected to the shell by means of a special angle ring of steel while the back plate is turned inwards all around its edge in order to form a flange that joins with the shell.

The two internal flues which also act as stays are made up in steel sections with ends flanged outwards and separated by formed stiffening steel called Adamson's rings.

These units vary from 6 ft. in diameter by 22 ft. long up to 9 ft. in diameter and 30 ft. long. The upper limit of the working pressure is usually a 180 pound gauge.

These Lancashire boiler flues are the same diameter throughout except for the last two rear sections, the next to the last section being tapered to fit into a small rear section of each tube. This is designed this way so that a man inside the boiler who enters from the top man-hole can slide in between the two fire tubes and get under them for cleaning and repairing.

There are in North England a number of Yorkshire boilers installed annually. Their design differs from the Lancashire boiler in that the two furnace tubes are smaller at the fire-grate end, the tubes increase gradually from front to back so that the gases are allowed more space as they expand. In order to make it possible for an inspector or a repairman to get under the flues of a Yorkshire boiler, it is necessary to have an additional man-hole at the bottom of the front head so that entry can be made directly beneath the tubes in addition to the man-head that permits entry above the tubes. Yorkshire boilers are made in sizes somewhat larger than the Lancashire boilers.

The Economic boilers are probably Britain's closest approach to the American horizontal return tubular boiler so common to many of us. The Economic boiler is built as an internally fired boiler the same as the Lancashire with two tubes, but the gaseous products of combustion after leaving the rear end of these flues return to the front of the boilers through a series of flues in the upper part of the boiler quite like our return tubular design. The Economic boiler occupies an area of approximately one-half of that of the Lancashire boiler, and where efficiencies of 65 per cent are considered good with either the Lancashire or Cornish boilers, thermal efficiency of 75 per cent can be expected with the Economic type. Economic boilers are designed and built for pressures up to 250 pounds and units up to 1000 boiler hp.

Probably the most popular type of vertical boilers used in Great Britain is the Cochran unit made in Annan, Scotland. It consists of a vertical shell with a dome shaped crown. It has a dome type of combustion chamber which is lined with fire brick. Gases pass out from the rather spacious combustion chamber into a second combustion chamber likewise lined with fire brick, thence the hot gases pass through a series of tubes installed through the vertical tubular section of the boiler. The gases pass from there directly to the chimney.

These vertical boilers are very popular in the smaller units since space is a very critical item in the manufacturing plants of a large number of British industries. Those of us who have lived in communities where there is ample floor space seldom appreciate how much these restrictions in space affect the designs of the auxiliary equipment and facilities of a manufacturing industry.

Fuel Storage and Heating

Fuel storage in Great Britain has never been very popular. It has always been possible for them to secure coal upon demand until the recent war.

At the present time, each family is limited to 34 hundred pounds per year. This must take care of cooking and heating unless hardships can be proved. Most homes are not equipped to store more than one to one and one-half tons of coal.

For the small industry, delivery is sometimes made by truck or what they term a *lorry*. These same small industries sometimes receive the delivery by a freight car that they classify as a wagon. These little cars generally hold a maximum of eight to ten tons.

This railroad car design has been largely controlled by the limitations of siding space available. Freight cars of the United States dimensions would not find room on many sidings.

British fire-places utilizing this coal have been developed to probably twice the efficiency of our American types, but even then do not generally exceed 20 per cent thermal efficiency. The opposition however, of British housewives to any heating unit projecting out into the sleeping or living rooms is very deep rooted. The National Fuel Research Laboratory spends much of its time testing and improving the designs of "in-the-wall" type of heating units.

To protect the consumer, British manufacturers are required to submit all of their fuel burning devices to the Fuel Research Laboratory for approval before they are placed on the market.

The degree day temperatures of Great Britain are computed from 60F instead of 65F. Since many winter seasons are relatively mild, the British family can get along for several days each week with one or two heating units in the kitchen and living room. The residents seem to prefer sleeping in cold rooms and in the home they usually wear heavy suits, sweaters, and robes. Even in churches and public meeting places, it is common practice for men and women to keep their heavy coats and overcoats for the entire service or meeting.

Coal Gas Manufacturing

Coal gas manufacturing is developed to a very high level in the British Isles. Almost all of the streets and alleys are paved with tar bi-products and a familiar sight in every large town or village is the gas holder and usually a near by brick water cooling chimney or tower. 450 Btu gas is available to a large portion of the population of the larger cities and even gas street lighting still prevails in many areas.

During the prewar days, electric heating was given great encouragement. When it was competing with open fire places with their ten or fifteen per cent maximum thermal efficiency, the heating by electricity could be sold on an economy basis. Radiant electric heaters are very common in many sections of Great Britain.

In the post war period, manufacturing which had increased greatly during the war needed much more power. There was not enough installed electrical capacity to meet the needs of industry and assure householders of an adequate heating supply in very cold weather.

Thus for the past five years, electricity for heating has been rationed. On cold days, you must agree to stay off of the system during peak load hours. The penalty for violation is complete disconnection. Industry itself is also penalized on such days by being required to reduce its lighting to fifty per cent of normal—a very doubtful practice since it lowers the manufacturing efficiency and increases the hazards of accidents.

Only recently has it been possible to secure permits to harness the rivers of Scotland and England for power production. For generations, the titled gentry of England and Scotland have successfully resisted the submerging of their mountain valleys in order to preserve such places as hunting and fishing reservations for their friends of the nobility. At the present writing, there are several projects authorized for development and dams are in the process of design and construction.

One inquiry that came to my desk at the Embassy was on the feasibility of transmitting Norway electric power four hundred miles under the North Sea to supply the industries of Scotland and North England. Apparently this proposal came from some of those who would postpone still longer the damning of the Scottish Rivers. It would be an undertaking with great potential hazard.

Chimney Design and Care

Any one with a builders design inquisitiveness is attracted by the large number of chimneys in the principal cities of Great Britain. It is not uncommon to see 12 to 14 chimneys rising up through each party or fire wall, thus, in a single block of 20 to 30 homes a host of chimneys can be seen from any point of vantage. In the separate homes, chimneys again are often intriguing in that they seem to ramble on over the entire end of the house.

Central heating has made necessary some improvements in chimney design for an individual house. The Housing Manual* for stove and boilers prescribes that the outlet of the heating unit must not be reduced by the chimney flue and generalizes that a 7 in. flue would be adequate for removal of products of combustion.

Some improvement has been made in that the modern "sweep" is equipped with a vacuum cleaner sweeping rod and canvas funnel which are attached to the fire place or chimney before any sweeping is done. By this attachment, the entire job can be done in about one hour and without showering the adjoining rooms with soot.

It is of interest that this procedure for cleaning chimneys still prevails. When most of the houses of Great Britain were thatched, there was some justification to keep the chimneys cle to prevent flue fires that might ignite the roof. In a region that is now mostly equipped with tile or slate shingle roofs, and in a land where rains and drenching mists occur very frequently, there does not seem to be much justification for a chimney sweep when the flue could be burned out clean with almost no fire hazard to the home or surrounding property.

While historically much of the early plumbing development can be traced to Great Britain, today they are trailing the United States in most every detail related to plumbing. Much of their layout design in each house is crude and unsightly, and their practices are far from modern. Many very fine homes are marred in appearance by the unfortunate locations of vent and over-flow pipes.

Strangely enough, some of their own 'government published' instruction books cover details on U. S. and Canadian plumbing practices, but the continuation of practices, considered obsolete a generation ago in the U. S. A., seems to persist. Much of this seems to be a determination by the plumbers to hold to the old and historic instead of adopting more acceptable types of equipment and facilities.

In closing this paper, may I emphasize that we must not assume for a moment that we can drift along assuming that we never need worry about British competition. When they feel that a new development is justified economically they may go all out for it. For example, Great Britain has advanced faster in farm mechanization, in chemical weed killing, in pasture control and in street and highway construction than we have just because they believe it is an economical investment. They do have to work harder against customer resistance because of the great reverence the British have for the *old*. As I have expressed before—their fourth dimension is *history* while *ours* is *productivity*. Probably both of us could benefit by exchanging our philosophies.

---

* Housing Manual 1944-Ministry of Health and Ministry of Work. His Majesty's Stationery Office.

(Continued on page 63)

Refrigerated Warehousing Industry

NEWS • ARTICLES • ANNOUNCEMENTS

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices:

Tower Building, Washington 5, D. C.

Executive Vice-pres., Wm. Dalton

President, Arthur N. Otis
New York, N. Y

Vice-president, Fred F. Alford
Dallas, Tex.

Treasurer, J. L. Gagini
Omaha, Nebr.

Warehouse Labor Not Subject to Transportation Tax

WAREHOUSE labor is not subject to the 3 per cent transportation tax according to a ruling by the U. S. Treasury Department. The question arose in connection with furniture warehousing and the National Furniture Warehousemen's Association requested a ruling. The Treasury Department's ruling held warehouse labor is incident to storage rather than transportation.

"In general, amounts paid to a carrier for loading, unloading, handling, sorting, tagging, or any other accessorial services furnished in connection with a taxable transportation movement, are subject to the tax. However, when such services are performed directly for a shipper or consignee by a person who does not transport the property which he loads or unloads, etc., amounts paid to such person . . . are not taxable, even though the person performing such services may be a carrier."

Price Support Program for Dried Eggs

THE Production and Marketing Administration of the United States Department of Agriculture has announced a program for support of farm prices for eggs during month of January and February through purchase of dried whole eggs in the midwest. Purchases will be made from driers who have paid producers for all of edible shell eggs they buy at certified farm price averaging not less than 25 cents a dozen (minimum of 27 cents a dozen for eggs delivered by producers to plant). Midwest price has been set for January and February to help attain the 1950 recently announced national annual average farm support price of 37 cents a dozen, which represents about 75 per cent of parity.

This 25-cent price to producers in the midwest compares with the certified price of 35 cents per dozen received by farmers from driers throughout this area in 1949 under support program at 90 per cent of parity. Egg driers were notified under Purchase Announcement (PY-57) that offers of dried eggs would be received by the Poultry Branch of PMA, beginning Tuesday, January 10, for delivery within 30 days following acceptance of offers.

The program is being placed in operation for a two-month period because of rapid decline in producer prices for eggs in many sections of country and sharply lower price levels existing in limited areas of North Central states. The present market situation, Department officials said, is caused primarily by recent record egg production resulting from a large and early hatch of chicks in 1949 and unseasonably mild weather. The market situation is expected to improve as egg breaking and freezing plants and hatcheries work toward capacity operation in a few weeks. Storage operations also are expected to increase, and it is believed that lower prices prevailing for eggs now will increase consumer use of eggs.

Chicago Stock Yards Reports Record Meat Production in 1949

THE year 1949 saw the largest peace-time meat production on record in Chicago it was reported by the Chicago stock yards. The total of 22,636,000,000 pounds represented over a billion pounds increase over last year. It compared to the war-time peak of 25,178,000,000 of 1944.

Meat experts expect that war-time levels of production will be reached next year. They cite population gains and relative high consumer demand as cause for continued high production. They point out that more and more of the current huge corn supply will go into livestock production.

Beef production this year at nearly ten billion pounds was nearly half a billion pounds over last year. The half billion pounds of lamb and mutton produced were the smallest slaughter in a quarter of a century, but authorities are expecting high market incentive and an improved labor supply in the west to cause producers to increase their flocks.

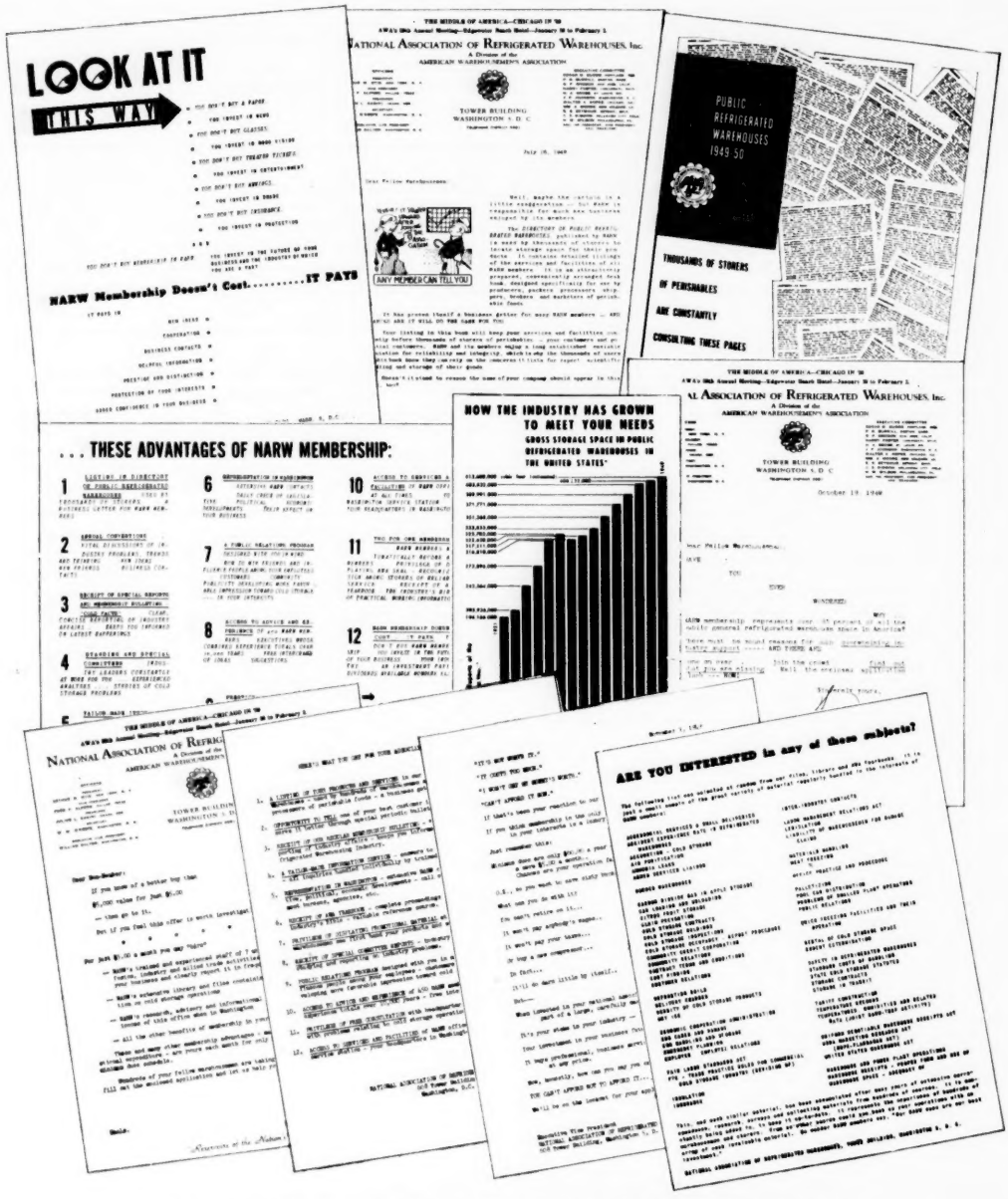
The Chicago Stock Yards in 1949 handled the largest hog receipts in three years, due in part to the large crop but also to a trend way from direct selling in the country. The price break is not expected to curtail production of hogs, since the corn-hog ratio is favorable to hog feeding. The average for the year was $18.25, a drop of $5.25 from 1948.

Though the cattle market broke badly early in the year, it enjoyed a large measure of recovery in later months. The price average of $25.90 was still the third highest average on record in Chicago. The price range between the various grades was one of the widest on record. Very prime selections were scarce, and a new all-time record was set November 25 when a load went at $43.50 per cwt. Demand for feeder cattle was good. The figures indicate the July to November totals of cattle moving to feedlots were a new record for the period.

Some record prices were established on the sheep market. Slaughter lambs went to $32.25 in early spring. Native spring lambs sold for a peak of $35.00, and yearlings went as high as $30.00, both prices being records. The year's lamb trade average $24.40, the second highest average on record.

Promotional Pieces Keep NARW Members and Customers Informed

BELIEVING in the concept that any trade association is obligated, and certainly justified, in keeping all segments of its "public" informed about what it is, what it is doing, and what it intends to do, the National Association of Refrigerated Warehouses is doing something about that concept. Several "promotional pieces" depicting the activities of the Association, challenging both membership and prospective membership, and telling the story of refrigerated warehousing to many and varied customer and public groups were issued during 1949. A few of these are reproduced below. William Dalton, executive vice-president, explains that each of these pieces were designed to accomplish a specific purpose whether they go to a member, or prospective user of warehouse service.


LOOK AT IT
THIS WAY
NARW Membership Doesn't Cost.....IT PAYS
NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES, Inc.
A Division of the
AMERICAN WAREHOUSEMEN'S ASSOCIATION
TOWER BUILDING
WASHINGTON 4, D. C.
ANY MEMBER CAN TELL YOU
PUBLIC REFRIGERATED WAREHOUSES 1949-50
THOUSANDS OF STORERS
OF PERISHABLES
ARE CONSTANTLY
CONSULTING THESE PAGES
. . . THESE ADVANTAGES OF NARW MEMBERSHIP:
HOW THE INDUSTRY HAS GROWN TO MEET YOUR NEEDS
GROSS STORAGE SPACE IN PUBLIC REFRIGERATED WAREHOUSES IN THE UNITED STATES*
ARE YOU INTERESTED in any of these subjects?

A few of the promotional pieces used by NARW during 1949.

Refrigeration Research Foundation Rounds Up Active Research Projects

PRESENTED below in tabulated form for easy reference is a round-up of the active research projects now being sponsored by the Refrigeration Research Foundation. Reports on some of these projects were made and some tentative-new projects were discussed at the annual meeting of TRRF held at the Edgewater Beach Hotel, Chicago, Ill., starting January 26. This tabulation shows a wide variety of subjects being covered, most of which are long term investigations. It does not include a number of short term investigations now being made.

No.	*Title*	*Institution*	*Leader*
2	Study of causes and prevention of undesirable changes in quality of fresh and frozen Gulf shrimp in refrigerated storage.	Louisiana State Univ.	E. A. Fieger
4	Low temperature psychrometry and moisture behavior at sub-freezing temperatures.	Northwestern Univ.	B. H. Jennings
11	Effect of different frozen storage temperatures upon certain characteristics of meat. I. Pork.	Kansas State College	Gladys E. Vail, J. L. Hall and D. L. Mackintosh
16	Heat transfer aspects of refrigerated warehouse packaged goods in steady and unsteady state as a function of physical properties and conditions.	Columbia Univ.	C. F. Kayan
17	Frozen eggs—their handling, freezing and refrigerated storage at different temperatures.	Ohio State Univ.	A. R. Winter
20	Determination of thermal characteristics of refrigerated foods.	Univ. of Texas	W. R. Woolrich
22	Use of mycostatic and bactericidal agents and refrigeration for preservation of certain perishable products and beverages in refrigerated warehouse cooler storage.	Oregon State College	E. H. Wiegand
23	Investigations of refrigerated storage of citrus fruit from Florida and Texas.	U. S. Dept. of Agriculture	J. R. Winston P. Harding and A. R. Ryall
27	Effect of refrigeration on peanuts and peanut products.	Georgia Agric. Expt. Station	J. G. Woodroof
28	Investigations of Staphylococcus in foodstuffs.	Univ. of Chicago	Gail M. Dack
29	Investigation of atmosphere control, air purification, and air conditioning in refrigerated warehouses on the quality of fruits, vegetables, eggs, meats, and other commodities.	Purdue Univ.	C. E. Baker
30	Air purification in storage of fruit.	Washington Agric. Expt. Station	A. VanDoren
31	Physical stability of frozen milk.	Univ. of Minnesota	S. T. Coulter
32	Effect of variation and fluctuation in temperature during course of transportation and warehousing of frozen foods.	Western Regional Research Lab. (Albany, Calif.)	R. R. Legault
33	Ripening quality of Anjou pears as influenced by concentration of ethylene in storage atmosphere.	Oregon State College	E. Hansen
34	Effect of refrigeration storage on popping volume, and quality of popcorn.	Iowa State College	J. C. Eldredge
36	Storage of candy.	Georgia Agr. Expt. Station	J. G. Woodroof
37	Neutralizing ammonia in storage rooms with sulfur dioxide and other chemicals.	Bur. Plant Ind., Soils & Agr. Engr. (Fresno, Calif.)	W. T. Pentzer
38	Refrigeration of peanuts and pecans for making candies the year round.	Georgia Agr. Expt. Station	J. G. Woodroof
39	Refrigerated storage of cheese. I. Control of biological factors.	Univ. of Wisconsin	R. J. Dicke
AM1	Effectiveness of radio-frequency radiation as a means of treating foods, prior to freezing, in order to inactivate enzymes.	Western Regional Research Lab. (Albany, Calif.)	T. M. Shaw Ben Makower

Refrigerated Warehousing Industry

Review of Refrigerated Warehousing

CONDITIONS in the refrigerated warehousing industry are reviewed in the following excerpts from letters received too late for publication in the annual review in the January ICE AND REFRIGERATION.

Space Occupancy

Colorado—Our percentage of occupancy through November, 1949 was 90.6 per cent compared to 97.3 per cent through November 1948. The difference was due primarily to less shell egg storage possibly caused by surplus and government support; big apple crop creating low market, and some individual packers providing their own freezer facilities.

Illinois—The percentage of occupancy for 1949 as compared with that of 1948 was substantially lower during the first four months of the year, slightly lower during the next four months and higher that of 1948 was substantially lower during the first four months of during the last four months. As to what we might expect for 1950, it is our opinion that there will be a continued high occupancy. In this connection it should be noted that in this part of the country there has been an increasing trend toward a greater demand for freezer space and a lessening demand for cooler space. This trend will undoubtedly continue.

Volume of Leading Commodities

Colorado—Volume commodities in 1949 were frozen meat and potatoes, as compared with apples, frozen meat, and shell eggs in 1948. 1950 prospects seem to hinge partly on government support and general crop outlook.

Illinois—The approximate volume of leading commodities for 1949 as compared to 1948 were as follows: Up—butter, poultry and frozen foods; down—shell eggs, canned eggs and meat. The prospects for 1950 are difficult to forecast at this time but it is our opinion that the situation will be as follows: Up—frozen foods, shell eggs, canned eggs and meat; down—butter; same—poultry.

Storage of Frozen Foods

Colorado—Frozen foods have picked up some, though distributors here have their own facilities.

Illinois—The volume of frozen foods for storage as compared to the previous year was the same to a little higher. The prospects for next year indicate the same volume to a little higher.

Costs and Income

Colorado—Handling expenses have been adjusted upward in some commodities, though refrigeration rates remained practically the same. Large lots having small quantity deliveries are definitely gaining our attention.

Illinois—Estimating the costs of warehouses in this particular locality, it is our opinion based upon our own experience that costs have been in line with income as compared to previous years for the reason that even though our costs are higher our income has also been higher. Of course, some of the increased costs are fixed costs and this means that if our tonnage should drop substantially over an extended period, our costs would be way out of line with income.

Developing New Services

Colorado—We are still in search of good cooler commodities for spring and summer storage and may start a limited play on dried fruit. Citrus storage seems to depend a great deal on the weather here and in growing areas. Our know-how of storing citrus fruit might encourage longer storage hold, but market conditions still have greatest bearing.

Illinois—One of the outstanding new commodities for storage seems to be coffee. One of the problems here would be to keep the cost of the product in line with coffee which has not been put under refrigeration. The housewife probably would not be willing to pay more than a cent or two for the extra quality. In referring to coffee for storage it is our understanding that the experiments made so far are with raw coffee and that it has been stored very successfully at low temperatures (below zero). One of the biggest potential products for storage is frozen concentrated orange juice. Probably 25 to 40 per cent more will be stored in 1950 as was stored the past year.

The Help Situation

Illinois—Yes, we were able to employ adequate help. There has been a better group of applicants for jobs from which to make a selection. We anticipate no difficulty along this line for 1950.

Industry Problems

Colorado—If our local egg storage for 1949 compared with 1948 and former years is used as an indicator, the surplus created by government support has not helped but has hindered our storage demand.

Illinois—One of the industry's most outstanding problems in 1949 has been the tremendous increase in truck traffic to and from our plants, along with a substantial decrease in rail traffic. This has meant that wherever possible receiving and delivery platforms have had to be re-vamped or expanded to take care of this shift in traffic. The other outstanding problem has been the increase in costs which has placed a greater emphasis on cost analysis and control. Much work is yet to be done in this field.

Building Better Business

Illinois—By rendering better service to our customers is the only way warehousemen can create better business and bigger volume. Part of this better service is in keeping our customers advised of any research developments on products in which they may have an interest.

Fact Finding Conference

THE mid-century Fact Finding Conference will be held by the Institute of American Poultry Industries at Kansas City, Mo., February 11-14, 1950. Besides a full educational program to help industry do a better job, extra events will turn the spotlight on 50 years of progress, on the new vs. the old, on firms that have been in business since 1900, and on second and third generation lads starting up the ladder.

Some thirty or forty leading food editors and consumer agency representatives will appear the opening day, for a special preview of the commercial exhibits and a new feature: the Poultry Products Marketing Mart, a display of modern-day trademarked poultry and egg products. Another feature will be a historical exhibit to show how industry did things fifty years ago.

Exhibits and registration open Saturday noon. Saturday evening a Junior-Senior dinner will honor firms in business since 1900 and the youngsters just getting started.

Monday morning, a plant efficiency clinic, dealing with better maintenance of equipment such as motors, refrigeration machinery, trucks and processing machines, plus a session on "home-made" cost cutting gadgets and a skit presentation of employee "trainmanship." Monday afternoon, poultry processing clinic; Monday night the FFC banquet; Tuesday morning, production clinic; Tuesday noon, a luncheon program beamed at closer tie-ins between extension services and industry programs. Tuesday afternoon the egg processing clinic.

High spots of the conference entertainment: specially grown, specially "treated" and specially grilled chickens-of-tomorrow at the banquet Monday night, plus the national finals of PENB's record-breaking Fowl Fashion Contest, and a long distance hook-up with Jimmy Rice in Miami, in connection with the Rice Memorial Library project.

Turkey Support Program Amended

THE U. S. Department of Agriculture has amended the 1949 turkey price support program to permit producers or their agents or cooperative organizations to sell turkeys which were processed between August 1 and December 31, 1949, to the Commodity Credit Corporation during the month of July, 1950. This action is being taken in response to requests from producers that they be permitted to offer any unsold 1949-crop turkeys to CCC in July 1950.

The change will give producers and cooperative organizations opportunity to store turkeys before January 1, 1950. If the turkeys are not sold in commercial channels before July 1 the producers or cooperative organizations may offer them to the Government to obtain prices for the dressed birds reflecting the support level for live birds which prevailed for the August 1 through December 31 period, the 1949 marketing season.

Offers of frozen dressed turkeys have been received from producers and processors since the support program became effective August 1, 1949. Despite a turkey output this year estimated at about 675,000,000 pounds, dressed weight, the second largest crop on record, it has been necessary to buy only 722,000 pounds for price support so far.

Cold Storage Holdings—Coolers Decline Freezers Show Increase

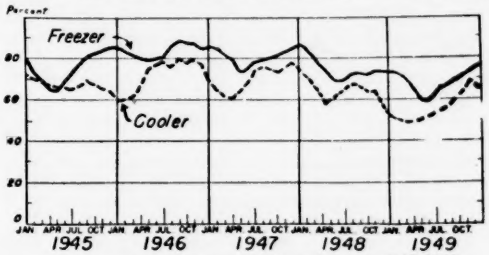
PUBLIC cold storage warehousemen reported coolers to be 64 per cent filled on January 1 and freezers 76 per cent filled. For coolers this was a decline of 3 percentage points since last month. Freezer occupancy, however, increased 3 points. Only the East and West North Central and Pacific regions reported cooler occupancy to be greater than the national average of 64 per cent. Freezer occupancy in all regions, except the Middle Atlantic, East South Central, and Pacific was higher on January 1 than a month earlier. The most significant increase, however, was reported in the West North Central region where freezer occupancy rose from 70 per cent on December 1 to 82 per cent on January 1.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Jan. 1, 1950	Dec. 1, 1949	Jan. 1, 1949	Five-year Average
Meat and meat products, lbs.	731,608	492,509	762,887	671,125
Lard and rendered pork fat, lbs.	72,617	39,808	116,397	95,949
Frozen poultry, lbs.	292,085	267,508	160,834	283,963
Creamery butter, lbs.	113,166	130,452	33,615	39,811
American cheese, lbs.	168,037	175,764	126,534	118,574
Other cheese, lbs.	16,740	16,721	18,146	17,622
Shell eggs, cases	97	250	159	329
Frozen eggs, lbs.	53,888	72,556	104,932	128,183
Apples, bu.	26,826	33,405	17,813	24,761
Frozen fruits, lbs.	303,202	326,934	335,940	364,061
Frozen vegetables, lbs.	363,965	383,658	281,825	252,957
Frozen fish, lbs.	150,036	158,719	150,974	137,532

Public cold storage warehouses in key cities reported cooler occupancy to be unchanged from last month, but freezers were more occupied than a month ago. Minneapolis was the only city reporting coolers and freezers to be more than 90 per cent occupied. Private and semi-private cooler space was 60 per cent filled on January 1 and freezers 66 per cent. Meat-packing establishments were 90 and 83 per cent filled in coolers and freezers, respectively, on the first of the month.

The total weight of all foodstuffs in refrigerated warehouses totaled 4.4 billion pounds on January 1, only 300 million pounds less than the record January high of 1948. Cooler-held commodities on the first of the month amounted to 2.6 billion pounds, or about 10 per cent less than last month. Freezer-held commodities increased since last month by 141 million pounds and amounted to 1.8 billion pounds on January 1. The net reduction in cooler-held commodities since last month was primarily in fresh fruits, cheese, and shell eggs, but this net out-of-storage movement was countered by net increases in stocks of nuts, nut-meats, and selected meat items. Frozen meats, meat products, and poultry moving into storage during December more than offset the seasonal withdrawals of frozen fruits and vegetables and dairy products. During December, more than 238 million pounds of meats and poultry moved into freezer storage and these food items accounted for more than 40 per cent of the total weight in freezers.



Occupancy in Refrigerated Warehouses, 1945-1949

Seasonal withdrawals during December of 7 million bushels of apples and 600 thousand bushels of pears left 27 and 2 million bushels, respectively, on hand January 1. Compared with average January stocks, current apple holdings were 2 million bushels greater than average, but holdings of pears were below average for this time of year.

Frozen fruits were reduced to 303 million pounds by

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		Jan. 1, 1950 (%)		Dec. 1, 1949 (%)		Jan. 1, 1949 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,213	5,514	59	84	66	82	34	76	56	81
Middle Atlantic	38,850	29,698	62	75	65	75	53	71	67	84
East North Central	27,792	27,858	67	74	70	70	51	73	63	80
West North Central	10,209	14,643	73	82	71	70	59	78	64	82
South Atlantic	8,540	5,589	62	79	61	75	56	78	65	86
East South Central	4,028	3,524	62	81	73	83	60	88	71	77
West South Central	6,698	6,714	64	60	61	52	67	74	68	82
Mountain	1,882	2,396	60	72	63	69	41	50	61	83
Pacific	16,321	18,532	65	78	71	78	59	64	68	77
United States	117,533	114,468	64	76	67	73	54	72	66	82

Frozen fruits were reduced to 303 million pounds by

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Jan. 1, 1950		Dec. 1, 1949		Net Piling Space (000 Cu. Ft.)		Space Occupied Jan. 1, 1950		Dec. 1, 1949	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	320	171	66	82	70	80						
Middle Atlantic	1,596	1,199	59	80	68	75	2,011	312	88	86	88	86
East North Central	3,225	1,668	68	49	68	48	4,490	1,427	89	89	86	85
West North Central	807	2,499	87	86	98	91	14,370	5,454	87	77	88	77
South Atlantic	525	1,387	51	16	61	34	569	154	99	99	85	98
East South Central							403	109	85	94	85	89
West South Central	332	81	33	68	23	68	2,621	476	100	100	97	100
Mountain	117	38	92	79			421	366	100	100	100	100
Pacific	3,657	2,258	49	77	56	75	2,835	595	96	95	94	97
United States	10,579	9,301	60	66	64	67	27,720	8,884	90	83	89	82

NOTE: Blank spaces indicate that insufficient returns were received.

January 1. This seasonal net reduction of 24 million pounds compares with last year's net change of 11 million pounds and average December withdrawals of 17 million pounds. Significant withdrawals were especially noted for such frozen fruits as cherries and strawberries. Although total frozen fruits in storage on January 1 were below average, frozen cherries, raspberries, strawberries, Young, Logan and similar berries were greater than their respective average January 1 stocks.

Following the seasonal pattern, there was a net reduction of 20 million pounds in the holdings of frozen vegetables since last month. January 1 stocks amounted to 364 million pounds, more than 100 million pounds greater than average for this time of year. Frozen lima and snap beans, broccoli, brussels sprouts, cauliflower, and spinach in storage exceeded all previous January 1 holdings on record. The net withdrawals during December were less than the net change last year this date by about 7 million pounds. Green peas and lima beans showed the greatest net change since last month.

Creamery butter holdings were reduced by 17 million pounds since last month to a total of 113 million pounds on January 1. This net reduction was a little more than half the average December to January change. Of the total butter in storage, more than three-fourths was held for the account of Government agencies.

American Cheddar cheese amounted to 168 million pounds out of a total of 188 million pounds of all types of cheese in storage on January 1. First-of-the-month stocks of American Cheddar were the second highest January 1 holdings on record, being only 4 million pounds less than the all-time January high of 1942.

Shell egg stocks were down to 97 thousand cases by January 1 for an all time record low for the month. During December more than 150 thousand cases moved out of storage. Frozen eggs also decreased since last month as net withdrawals amounting to 19 million pounds left 54 million pounds in storage on the first of the month. There were less frozen eggs in storage this month than on any January 1 since 1937. The case equivalent of all eggs in storage amounted to almost 9 million cases.

Frozen poultry holdings on January 1 totaled 292 million pounds, a net increase of 25 million pounds since last month. The net increase was more than three times the average December to January change, and was in contrast to a net decrease in stocks reported this time last year. Holdings of all classes of frozen poultry in storage, except broilers, roasters, and ducks, were greater than a month ago, with frozen turkeys showing the most significant increase of all. Since last month there was a net increase of almost 20 million pounds of turkey, fowls increased by 6 million pounds.

All classes of meats in storage amounted to 732 million pounds on January 1. This compares with average January stocks of 671 million pounds and 763 million pounds reported a year ago. Frozen beef amounted to 111 million pounds, up 31 million pounds since last month. Frozen pork increased 146 million pounds since December 1 last and totaled 244 million pounds on the first of this month. This net increase was more than two thirds greater than average, but was about equal to the net increase of a year ago. Lard and rendered pork fat amounted to 73 million pounds on January 1, which compares with average January 1 stocks of 96 million pounds and 116 million pounds of a year ago.

Stocks of all fishery products in storage January 1 amounted to 171 million pounds of which 150 million pounds were frozen. During December there was a net withdrawal of 9 million pounds of frozen fishery products, primarily in such species as halibut, salmon, shrimp, and miscellaneous fillets. Current holdings of frozen fishery products were above average for January 1, but were about equal to the stocks of a year ago.

Storage Outlook

At the start of the year, cooler occupancy in public storages was 10 percentage points better than last year and only 2 points below average; a year ago, coolers were 15 points below average. Thus, by comparison with last year, public coolers are operating at a higher level of occupancy as they start their downward cycle in the months to follow. According to past records there is a gradual decrease in cooler use because of the net withdrawals of foodstuffs which will be reflected in lowered occupancy. Generally, a decrease of 2 to 3 points in occupancy can be expected by February 1. Freezer occupancy, likewise, opened stronger than last year with 76 per cent of the public freezer space being utilized, which compares with 72 per cent last year. The increase since last month of 3 points was in contrast to previous performance wherein freezer occupancy on January 1 was unchanged or down a point from the December level. Freezer occupancy should decline by February 1, however, for there is no instance on record of any increase during this period. The expected decrease is 3 points, which would place freezer occupancy at the level reported in 1945.

Cold Storage Stocks of Selected Frozen Fruits and Vegetables

STOCKS of frozen peaches, raspberries, and strawberries in storage December 1 amounted to 103 million pounds. Sixty-nine per cent of this total were classified as to container size. The ratio of consumer-sized packages to larger cartons remained at a record high with 37 percent of December stocks reported to be in retail containers. For individual items 44 per cent of the peaches, 21 per cent of the raspberries, and 44 per cent of the strawberries were in packages of one pound or less. Last year at this time the percentages of stocks in this type package were 33, 11, and 28, respectively.

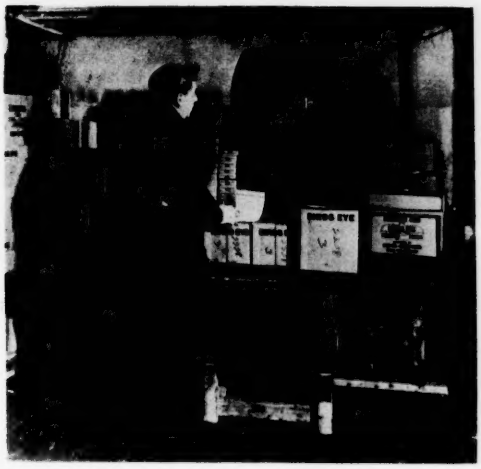
Cold Storage Stocks of Frozen Fruits and Vegetables in Storage December 1 and November 1, 1949, in Packages of One Pound or Less (000 Lbs.)

	December 1, 1949		November 1, 1949	
	Lbs.	Pct.	Lbs.	Pct.
Peaches	5,572	44	6,131	46
Raspberries	4,730	21	4,974	21
Strawberries	16,026	44	18,463	41
Asparagus	2,946	73	3,892	75
Beans, lima	21,560	58	23,662	62
Beans, snap	18,677	68	19,758	66
Corn	10,103	38	11,390	40
Peas	36,171	59	39,434	58
Spinach	16,665	83	12,530	80

Fifty-nine per cent of the December 1 stocks of the selected frozen vegetables, which totaled 287 million pounds, were classified by warehousemen as to container size. Of the 169 million pounds classified, 59 per cent were reported to be in containers of one pound or less. This compares with 60 per cent reported in this type package last month and 57 per cent reported a year ago this time. An increase in the percentage of snap beans, green peas, and spinach in retail packages over that reported last month indicates a greater movement out of storage of the larger-sized packages. The proportion of spinach in retail packages rose to a new high with 83 per cent reported to be in this size container. Asparagus, lima beans, and sweet corn showed a decline in the percentage of consumer packages with 73 per cent, 58 per cent, and 38 per cent, respectively. This compares with 75 per cent, 62 per cent, and 40 per cent reported last month.

Frozen Food Concern Improves Facilities With New Refrigerated Storage Space

SINCE early 1948, the Birds Eye-Snider Division of General Foods Corporation has realized many advantages from the new refrigerated storage facilities it now occupies at Watertown, Mass. Prior to the move, its warehousing operation was carried on in a congested area in downtown Boston. The new facility has enabled the concern to provide better and faster service to food dealers handling its line of Birds Eye Frosted Foods; the greatly enlarged storage space permits handling of triple the amount of product previously stored and, through the use of modern material handling equipment, many efficiencies have been realized in the movement of products in the warehouse.



It is zero degrees Fahrenheit in this section of the shipping department of the cold storage facilities at Watertown, Mass., used by Q-F Wholesalers, Inc., a subsidiary of General Foods Corporation. Tons of various items of Birds Eye Frosted Foods have been brought in palletized unit loads by storage battery-powered fork trucks from the freezer areas into the "break-up" area for the filling of orders for retail outlets. As the order is processed it is re-packed in cartons which move along a conveyor to the scales (shown in picture above, with palletized loads of frozen food-stuffs shown at the left rear). Here the orders are checked and the weight recorded. The order is again placed on pallets for movement—again by means of the quiet, efficient fume- and heat-free operating battery-powered fork truck—to the loading dock.

Materials Handling

The installation of a storage battery-powered fork truck-pallet system has greatly facilitated the job of handling products in the refrigerated warehouse. Frozen foods being highly perishable must be handled quickly and with as little exposure to changes in temperature as possible. Battery-powered fork trucks, which operate without the emission of heat, have made them ideal for use in and out of refrigerated areas. Since they also operate fume-free, the battery powered truck is highly desirable for handling food products or other merchandise that might be contaminated.

As incoming merchandise is received in refrigerated railroad cars and refrigerated motor trucks, it is moved in palletized unit loads by means of storage battery-powered fork trucks into that part of a new public cold storage warehouse in Watertown, Mass., occupied by Q-F Wholesalers, Inc., subsidiary of General Foods Corporation. Since frozen foods are highly perishable it is essential that they remain at zero degree temperature until ready for use. Speed, therefore, is of the essence in moving the cartons of frozen foods. For this reason battery-powered industrial truck equipment was chosen.

After pallets are loaded within the shipping area of the cold storage facilities with cartons of frosted foods destined for retail outlets in the Boston area, they are moved to the shipping docks for loading. In the above picture a ton-and-a-half of cartoned merchandise is shown being moved by storage battery-powered fork truck to the tailgate of one of the fleet of refrigerated delivery trucks. The merchandise is not taken from the zero degree temperature holding room until the previous pallet-load is three-fourths empty. This is done to keep the merchandise at zero temperature as long as possible. When the truck is loaded, dry ice and heavy blankets protect the products while in transit to the retailer.

Q-F Wholesalers, Inc., a General Foods subsidiary, handle the distributing operations for Birds Eye-Snider Division at Watertown, and the refrigerated storage facilities are contained within a huge public cold storage plant which was erected by Quincy Market Cold Storage & Warehouse Co., of Boston. This latter company also uses storage battery-powered fork trucks and pallets in its operation, both at Watertown and in most of its other nine cold storage buildings in five market areas located in, and adjacent to Boston.

Birds Eye processing plants ship to the Watertown facility in full carload and truckload lots. Upon arrival the cars' contents are immediately palletized in unit loads of from 2,000 to 3,000 pounds. As fast as a unit load is built, fork trucks move it to the freezer areas within the plant. Here it is stored awaiting further handling.

Full pallet loads of products are moved into the "break-up" area which is kept at zero temperature. Here orders from individual retail food dealers are packed and readied for shipment to dealers by a fleet of heavily insulated trucks. As the orders are completed, the shipping cartons are loaded on pallets and the battery-powered fork truck moves the pallet load out to the tail-gate of an awaiting truck. Then the cartons are manually removed from the pallets and stowed aboard the truck. Dry ice is distributed throughout the truck to maintain low temperatures while the product is in transit. Protective blankets are also used as coverings over the dry ice to insure maintenance of near-zero temperature.

New Warehouse Chain Established

FORMATION of the J. Leo Cooke Warehouse Corp., national public merchandise warehousing and distribution chain, has been announced by J. Leo Cooke, president. Simultaneously, the company announced the acquisition of four buildings, comprising 250,000 sq. ft. of warehouse and storage space, in Jersey City, N. J., from the Bay Street Warehouse & Storage Co. The new company will occupy this space and general offices at 140 Bay Street.

Veteran of 25 years service in the public merchandise and refrigerated warehousing business, Mr. Cooke is president of the American Warehouseman's Association, Merchandise Division. During the war he served as director and secretary of the Federal Emergency Warehousing Association in the port of New York.

The Jersey City properties are the first in a chain of public merchandise warehouses to be established in strategic distribution points throughout the United States, Mr. Cooke said. They are served by the Pennsylvania Railroad and have ample facilities to meet the requirements of both local and over-the-road trucking companies. In addition, the company has arranged a trucking service program with the Storch Trucking Co., which operates a fleet of over 200 vehicles in Metropolitan New York.

Henry C. Kuehn Married

THE wedding of Henry C. Kuehn, president of the Wisconsin Cold Storage Co. Milwaukee, Wis. and Miss Ellen P. Lee was announced recently. Mr. Kuehn was a widower and Miss Lee was his former secretary. The event took place at Sun Valley, Idaho, Tuesday, January 3. The couple will occupy Mr. Kuehn's home at 2033 East Glendale St. Milwaukee. The former Miss Lee is a graduate of the Illinois School of Nursing, Chicago. Mr. Kuehn's two sons, James and Philip, are associated with their father in business.

The Storage of Hops

A REPORT from The Refrigeration Research Foundation calls attention to hops as a storage commodity, with reference to research done by Frank Rabak, formerly with the Bureau of Plant Industry and now consultant for S. S. Steiner, Inc., New York. This research covered domestic seeded and seedless hops from three Western states and hops imported from Czechoslovakia and Yugoslavia. Samples were held and analyzed over a period of five and one-quarter years. All of the samples showed very similar behavior in storage. From it, the following conclusions were drawn:

1. Research on hop storage has shown that storage at temperatures of 38 to 40° F. (and lower) with about 50 per cent relative humidity protects the soft resins (alpha and beta, the desirable resins) against deterioration and formation of the undesirable hard (gamma) resins.

2. Normal-compressed and double-compressed hops (11 and 12 lbs. per cubic foot, respectively) retain their quality remarkably well in cold storage (39-40° F.) for long periods. Throughout storage there is, of course, a gradual decline over a period of several years. This decline occurs sooner and is much more rapid under non-refrigerated storage conditions. Hops subjected to triple and quadruple compression (33 and 44 lbs. per cubic foot) would require much lower temperatures for storage, and they lose quality more rapidly at 70 to 90° F. than normally-compressed and double-compressed hops.

Information received from G. R. Hoerner, Hop Specialist, Extension Service Oregon State College, states that matters to watch for in hop storage quality are (1) molds, which may develop in cooler storage under conditions of high humidity if the hops are not sufficiently dried prior to baling and (2) development of unpleasant aroma and off-color. The "dry-down" ratio for hops is about 4 to 1, but seedless hops, which are being used increasingly, tend to lose greater weight in drying.

Recently U. S. Patent No. 2,473,395 was issued to George Segal, Great Neck, N. Y., entitled "Hop Treatment". It covers a method of treatment consisting of freezing fresh or carefully cooled hops at the rate of 1° F. per hour, holding in frozen state, thawing and thereafter drying the hops prior to use. The fact that the hops are frozen prior to drying would seem to make the process uneconomical. Whether better quality is possible is unrevealed.

Northwest Warehousemen's Association

THE annual meeting of the Northwest Warehousemen's Association which represents the warehousing industry in Minnesota, North Dakota and South Dakota was held at Duluth, Minn., December 2. Minneapolis members of the association travelled to the meeting in a special reserved car on a Great Northern train.

Chief speaker at the meeting was Willard A. Morse, president of the Security Warehouse Co., Minneapolis, whose father was the first warehouseman in that section. Mr. Morse reviewed the warehouse business during the last forty years, and pointed out the changes and problems facing the industry today. Taxes since 1929, he said, have increased more than 200 per cent and another increase is on the way in the form of pensions and social security.

To offset loss of business, warehousemen are now looking for new sources of revenue, A. J. Sheridan, Duluth Van & Cold Storage Co., stated.

Lloyd Borg, Public Relations Director of the Minneapolis Chamber of Commerce emphasized the value of advertising as a means of offsetting loss in business.

Utah Ice & Storage Replaces Building Destroyed in Costly Fire

CAPPING a remarkable comeback from a disastrous $1,500,000 fire which razed its three-story storage annex July 26, the Utah Ice & Storage Co., of Salt Lake City, Utah recently dedicated a new modern storage warehouse on the site of the destroyed structure. The new warehouse was completed within 70 days after the debris from the fire had been cleared away. Construction was rushed to accommodate a heavy influx of Utah's 1949 turkey crop. The new warehouse can store some 5 million pounds of poultry.

Exterior view of the new modern refrigerated warehouse erected where the ruined annex had stood.

Interior view of freezing pipes in poultry storage room of Utah Ice and Storage Co.'s new warehouse.

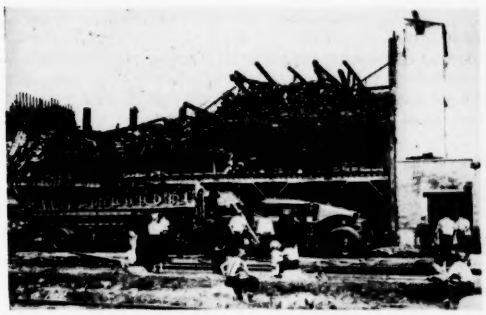
The building, a one story structure, 150 x 150 ft. with a 14 ft. ceiling is built of 8-in. cinder block with a moisture seal on the inside. This moisture seal is heavy roofing paper and pitch, then 12 inches of fibreglas insulation then a 4-in. cinder block wall which is tied to the outside wall. The ceiling has 18 inches of fibreglas insulation.

Floor Construction

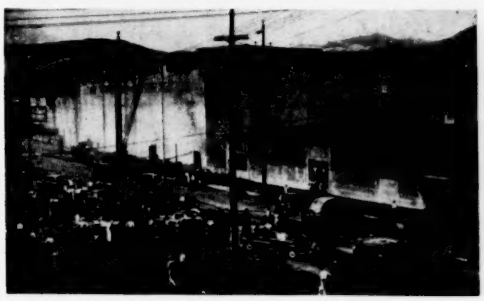
For the floor construction, an excavation of three feet was made below the floor line and on this base was placed a 4-in. moisture seal made up of hot tar, four inches of hot asphaltum, rolled and packed, and another coating of hot tar. Upon this was placed two inches of dry cinders and on top of this was installed a 6-in. concrete reinforced floor.

The cabinet freezers have a capacity of two carloads every twenty-four hours and are equipped with three flooded evaporators with 4,000 feet of 1¼-in. pipe in each

Closeup view of packed turkeys being handled in new warehouse of Utah Ice & Storage Co.



Showing part of damage caused by disastrous fire June 28.



Firemen arrive at outset of fire. Pictures from August issue of ICE AND REFRIGERATION.

evaporator and 33,000 cu. ft. per min. of air blowing through each one. These freezers are operated on two stage compression.

The remainder of the building is refrigerated with ceiling coils, 45,000 feet of 1¼-in. pipe. These coils are broken up into 27 banks and are operated as a modified recirculating system. The ammonia to the ceiling coils is furnished by two York 20 gal. per min. liquid pumps feeding coils through ½-in. regulating valves. Between the two pumps is a 16 x 72 in. vertical liquid accumulator for the purpose of keeping the pumps supplied with liquid, the liquid being kept at a constant level in this accumulator by the use of a low side float.

The liquid and gas return from the coils through a five inch header to two 36 in. x 16 ft. low pressure receivers which drain the liquid off to the accumulator, permitting the gas to go back to the compressor room off the top of each low pressure receiver.

This system will operate at 10 F with a 4 F temperature difference between refrigerant and room. This retains a high relative humidity, retarding the freezer burn of stored products. Temperatures in both the freezers and the room can be held at any desired practical temperature by starting additional compressors. It has not been necessary to use two-stage compression, other than on the quick freezers. A system of cross piping and valving in the engine room make it possible to switch easily from one compressor to another. The refrigeration system is basically of York design.

In all this new construction, extra precaution was taken to see that it would reduce all fire hazards to a minimum. Investigation after the July fire had revealed that a wire leading from a fuse box to a ventilating motor had shorted, igniting a nearby wall partition filled with sawdust.

New Refrigerated Storage Centers

A NETWORK of flexible refrigerated storage centers for perishable air cargo is being set up at key points along the transcontinental system of Northwest Airlines. Compartmentalized for storage at various temperatures as low as 12 degrees below zero, the refrigerated rooms boast the latest in cold-keeping and each is able to store 6,400 pounds of cargo at one time, according to J. W. Mariner, director of cargo traffic. Seattle, Portland, Billings, Minneapolis-St. Paul, Milwaukee and Chicago are the ports of refrigeration.

Straub Named Comptroller

THE appointment of James M. Straub as comptroller has been announced by Merchants Refrigerating Co. of New York. Mr. Straub is co-author with D. O. Haynes of a series of articles on refrigerating storage costs now being published in ICE AND REFRIGERATION. The same announcement states that John E. Moore and Edwin M. Neylon have been appointed vice- presidents and Niles R. Berny as assistant vice-president.

Terminal Corp. Declares Dividend

DIRECTORS of the Terminal Refrigerating & Warehouse Corporation, Washington, D. C., has declared the 148th consecutive semi-annual dividend of $1.50 per share, payable December 31, to stockholders of record December 23, president James J. Hughes announced recently.

Seattle Cold Storage Expanded

THE recent extensive damage to the Port of Seattle's cold storage facilities at its Spokane St. Terminal in the 1949 earthquake have been repaired and the building renovated according to an announcement by J. A. Earley, president of the Port of Seattle Commission. The remodeling job cost $60,000.

Mr. Earley also announced that the Port plans to spend $600,000 to expand fish-house cold storage facilities at the Spokane St. Terminal. It calls for modernization of existing facilities and 20,000 sq. ft. of cold storage floor area through the construction of a two-story warehouse adjacent to the present cold storage building. Also an expenditure of $100,000 is planned for improvement of the Port's Bell St. Terminal as a cold storage facility. Funds for the expansion were provided in a bond issue approved by the voters at the last election.

The present plan is to convert 6,000 sq. ft. of dry storage area on the second floor and 16,000 sq. ft of dry storage area on its third floor into cold storage, with the addition, also, of sharp-freeze rooms and equipment on the terminal's ground floor.

Pacific Northwest Elects Officers

AT A MEETING of the Pacific Northwest Association of Cold Storage Warehousemen held in Seattle, January 10, E. F. Swanberg, manager of the Diamond Ice & Storage Co., Seattle, Wash., was elected president. He succeeds C. B. Hart of Tacoma, Wash. Other officers elected at the meeting were Vice-president, A. E. Soli, American Ice Co., Everett, Wash.; Secretary-treasurer, William Baker, Seattle Ice Co., Seattle, Wash.

Named to the executive board were: Dr. George M. Anderson, Baker Cold Storage, Lynden, Wash.; Paul Henningsen, Northwestern Ice & Cold Storage Co., Portland, Ore.; George Haecker, Booth Fisheries Corp., Seattle, Wash.; Lynn Mills, Pacific Refrigerating Co., Tacoma, Wash.; Dick Lamb, F. G. Lamb & Co., Freewater, Ore.; and Mary Elizabeth Nye, The Arctic Co., Spokane, Wash.

Canadian Cold Storage Holdings

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on December 1, 1949.

Apples in cold storage on December 1, 1949 amounted to 8,919,616 bu. as compared with 5,129,432 bu. December 1, 1948 and 969,958 bu. November 1, 1949.

Frozen fruit holdings in storages and factories December 1, 1949 amounted to 15,892,000 lbs. as compared with 16,815,000 lbs. December 1, 1948 and 17,159,000 lbs. November 1, 1949.

Stocks of frozen vegetables in storages and factories on December 1, 1949 amounted to 8,304,000 lbs. as compared to 6,694,000 lbs. December 1, 1948 and 9,194,000 lbs. November 1, 1949.

Foreign Trade Zone Established

A NEW foreign trade zone has been established at the municipal airport at San Antonio, Tex. It will be constructed and operated by the Scobey Fireproof Storage Co. and will provide merchandise and refrigerated storage facilities, plus fumigation rooms and handling space. This is the sixth such zone established in the U. S. and the first to be built and operated by a private concern.

Problems in Northwest Apple Storage

DELICIOUS apples held at 30 F. may have a normal storage life expectancy of 280 days; but the longer the delay in cooling the shorter will be the period in which the fruit retains its original high quality, G. F. Sainsbury, U. S. Department of Agriculture engineer, told the American Society of Agricultural Engineers at their annual winter meeting in Chicago.

Reviewing apple storage and handling methods in the Pacific Northwest apple growing areas, where 55 per cent of the crop is of the Delicious variety, he asserted that new problems have been raised in storage construction, cooling equipment, and handling methods by recent developments in the industry. Investigations by the Bureau of Plant Industry, Soils, and Agricultural Engineering on these problems have brought out a need for close attention to air temperature and humidity relationships, air distribution, and rate of cooling. Widespread mechanical handling of apples with pallets and fork-lift trucks has added to storage difficulties because in many plants doors remain open for most of the day during loading or unloading.

One week of standing outside at 70 F. will reduce the storage life of Delicious apples approximately nine weeks, or one week at 53 reduces storage life approximately one month. In actual practice, fruit temperatures are not lowered to the desired temperature immediately, because of grading and packing operations.

"Without cold storage it would be impossible to extend the marketing season over a period long enough to dispose of the fruit in an orderly manner at a price that would return the farmer a profit on his investment, or indeed, even wages for his year's work," the USDA agricultural engineer stated. "With cold storage it is possible to supply apples in good condition to sustain consumer demand throughout a season extending from September to July."

The Pacific Northwest apple-growing area places heavy reliance on cold storage. In recent years average apple production in Washington has been about 32,000,000 bushels and in Oregon 2,900,000 bushels. The same cold storage facilities also handle about 8,600,000 bushels of pears produced in Washington and 5,900,000 bushels produced in Oregon. Next to the Delicious apple, the Winesap is the most commonly grown, representing 30 per cent of the crop, with other varieties comprising about 15 per cent.

Heavy concentration on the Delicious variety, which is harvested during warm weather, during the last 15 years has had a marked effect on storage design. Once mature, the crop is harvested quickly, imposing a heavy load on storage facilities. Prompt cooling to 30 to 32 F. is essential. Apples held at 70 F. have a normal storage life expectancy of only 20 days. If cooled to 30 F. within 7 days, they will have a storage life expectancy of 250 days, but if cooled only to 32 F., life expectancy drops to 200 days.

Uniform distribution of cooled air is essential, Mr. Sainsbury said, with a minimum of variation. Refrigeration capacity must be capable of handling the peak load, but it also should be flexible enough to operate efficiently at partial load. Insulation of floor and ceiling is desirable. A "must" is that the refrigeration be uniform throughout the storage.

Palletized handling of apples in storage imposes special requirements, including construction of buildings with few columns, entrances wide enough for passage of trucks carrying the pallets, and special automatic or semi-automatic power-operated sliding doors installed back of cold storage doors so that the storage can be kept closed except for the short intervals when the trucks pass through. Among the newest innovations is the use of "squeeze" trucks instead of fork-lift trucks. A "squeeze" truck has horizontal arms which lift boxes or packages by applying pressure at the sides. They eliminate the need and expense for wooden pallets, and hold promise of usefulness in smaller or older type storage plants.

Storage of Alfalfa Meal

A PROGRAM of research is under way by the American Dehydrators Association, representing manufacturers of alfalfa meal, and The Refrigeration Research Foundation, to develop means of meeting problems of packaging and storage. This product is produced in considerable volume and it is of special interest to commercial refrigerated warehouses because of its possible value as a desirable storage product.

In a talk before the American Dehydrators Association, J. H. Burrell, of the Ralston Purina Co., St. Louis, Mo., stated that about 567,000 tons of alfalfa meal were produced in 1946-47 and 707,000 tons in 1947-48.

It is one of three highly important ingredients in commercial fields, the other two being corn and soy bean meal. The feed manufacturer is particularly interested in alfalfa meal for its carotene (a vitamin, the plant form of vitamin A), its protein and other factors. However it is the worst feed ingredient of all to handle, causing high labor turnover and makes dust respirators necessary. It shrinks four to five lbs. per bag. Of 1400 cars in 1947, 50 per cent met the guarantee of 100,000 units of vitamin A or equivalent per lb. and 60 per cent met the usual standard of 17 per cent protein. One out of eight cars failed to meet standards in protein carotene.

A survey of cold storage plants that had stored alfalfa meal recently was made. Invariably correspondents mentioned the dustiness and difficulties in cooling and handling. One mentioned the possibility that empty ice storage space with high ceilings might be used. The same correspondent also mentioned the apparent willingness of the feed industry to pay a premium for high carotene content.

Much research is under way and has been accomplished. A major effort has been that directed toward use of an antioxidant that could be combined with meal to stablize the carotene. At least one such stabilizer has undergone commercial trials. Sealed containers, with packaging of meal at fairly high moisture content, have been reported to be effective. A recent report, however, has recommended 8 per cent moisture as most suitable whether the meal is sealed or unsealed.

Of special interest to cold storage, however, are the facts that cold storage is effective, and if problems of cooling, sacking or packaging in such a manner as to contain the dust and increase the density could be solved, alfalfa meal might become a more economical, and in fact a highly desirable, storage product.

Under the stimulus of the American Dehyrdators Association a lively research program is under way.

Summary

Cool storage (in the neighborhood of 40° F.) with moderate relative humidity (about 75 per cent) is an effective means of preventing loss of carotene in alfalfa meal.

Under these conditions, retention of carotene will be about 90 per cent over six months as compared with about 50 per cent at room temperature. Temperatures of 80 and 90° F. will cause losses of ⅔ to ¾ of the carotene in six months.

Because of its bulk, dustiness, and difficulty in handling, alfalfa meal is difficult to store. It is, however, a large-volume crop, highly valuable particularly for its carotene, and it seems quite likely that research will solve problems and make major improvements in alfalfa meal within the near future.

Frozen Foods

Reg. U. S. Patent Office

COVERING EVERY PHASE OF THE QUICK FREEZING OF PERISHABLE FOODS—PREPARATION, PACKAGING, FREEZING, STORAGE, DISTRIBUTION, DESIGN, CONSTRUCTION, EQUIPMENT, OPERATION OF LOCKER PLANTS.

Railroads Expect Increase in Frozen Food Shipments

A SHARP increase in rail shipments of frozen food products of all varieties has been forecast by the nation's railroads for the first quarter of 1950. The thirteen Regional Shippers Advisory Boards, an affiliate of the Association of American Railroads, estimate that shipments of frozen foods the first three months of this year will show an increase of close to 21 per cent over the corresponding months of 1949. That will be the sharpest rise in carloadings for any commodity shipped by rail. Carloadings in general are expected to show only a 2.3 per cent increase the first quarter of 1950 over the like months of 1949.

Carloadings of frozen fruits, vegetables and other products for three months ending March 31, 1950 are estimated at 12,700 cars, compared with actual loadings of 2,557 cars in the first quarter of 1949.

The carloadings figures are normally a good indication of the trend of distribution of various key commodities. AAR member railroads are continuing to experiment with new types of refrigerator cars and improvements on existing reefer cars in an effort to reduce shipping costs of frozen products and prevent possibilities of quality deterioration on long hauls.

Washington Dairy Sells Frozen Foods

A DAIRY company in Washington, D. C., is experimenting with door-to-door delivery of frozen foods, and believes it has developed a successful, low-cost method of handling this type of business. According to Robert Saltzstein, director of the dairy's frozen food sales, it was necessary to "start from scratch" in handling frozen foods, for there were few precedents for this type of operation. The company had a twofold objective: to build up its overall business by handling two types of perishables, milk and dairy products, and frozen foods; and to attract new customers who would be interested in home delivery of both milk and frozen foods.

The company carries an average inventory of 85 types of frosted foods, including frozen orange juice concentrate which is one of the biggest sellers. Orders are placed in advance, the milk truck driver delivering each customer's pre-arranged list of frozen foods along with dairy products.

Model Farms puts out a weekly bulletin listing its "specials" for the week, plus current prices. The reverse side of the bulletin contains educational material on how to cook frozen foods, menus and recipes. Each regular customer is contacted by phone from the Model Farms headquarters early in the week, and the housewife gives her week's frozen food order, to be delivered with her usual milk deliveries during the week. Customers not on the regular list may phone in their frozen food order any day of the week for delivery on the next milk delivery day. (Washington dairies like those in most other major cities deliver milk every other day).

Each frozen food customer is assigned a number, and all orders are filled in the order in which these numbers fall. Ordinary store-variety frozen food cabinets at the dairy's headquarters are used to hold stock; the dairy also rents bulk cold storage space at a local warehouse. Each delivery truck has a special insulated container refrigerated by dry ice for carrying the frozen food orders to householders.

Consumer reaction to the experiment has been successful to date. Mr. Saltzstein emphasizes that the project is still being tested, and techniques are revised to meet changing conditions. However, he foresees an important future for frozen food merchandising by many dairy firms once the idea takes hold on a broad basis.

Frozen Foods Increase in Popularity

FROZEN foods have become widely popular, but a government survey shows they are likely to play an even greater part in the feeding of America. And prices may eventually be greatly reduced, says a recent news report.

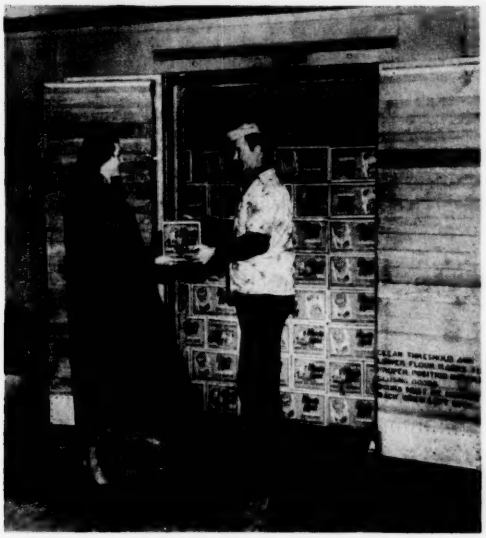
Despite the rapid gain in demand for frozen foods, a great many marketing problems still have to be ironed out, reports the U. S. Department of Agriculture. There are still very few facilities for handling and storing frozen foods by wholesale plants. And there's a big need for low cost transportation capable of holding frozen foods at a low temperature for long or short hauls. Retail stores also lack freezer storage space which means that wholesalers must deliver in small lots.

"If retail stores were equipped with freezer storage," the report said, "wholesalers could make larger and fewer deliveries and thus reduce costs of distribution. This cost is still high and amounts to a considerable part of the price consumers pay for frozen foods." The USDA expects the retail prices of frozen foods to decline once these costs are brought down.

Food Freezer Buys Canning Plant

THE former B & F Canners Cooperative plant in Fredonia, N. Y., has been purchased by Buffalo Frosted Foods, Inc., Buffalo, N. Y. for the purpose of canning and freezing fruits and vegetables. Louis A. Catalano, vice-president and secretary, will be the general manager of the Fredonia plant and will also be manager of the company's plant facilities in Buffalo and Judsonia, Ark.

Frozen Orange Juice Shipped in Mechanically Refrigerated Car



First case of Minute Maid fresh frozen orange juice to be shipped by train at sub-zero temperatures is received by Gretchen P. Weigel, assistant traffic manager of Minute Maid, as mechanically refrigerated car arrives at Jersey City warehouse from Florida. The new car makes the run without a stop for servicing.

Fish Freezing and Storage Leaflet

A REVISION of Fishery Leaflet 128, "Refrigerated Locker Storage of Fish and Shellfish," has been issued by the Fish and Wildlife Service for the information of locker operators and homemakers on the preparation, packaging, freezing, and storage of fish in lockers and home freezers.

The frozen-food locker has proved an excellent facility for maintaining an ever-ready supply of a wide variety of superior quality fish at moderate cost. Purchased in season, fish can be obtained in comparatively large quantities at reasonable prices. Properly prepared and stored, frozen fish are equally as good as fresh fish since the freezing process makes no appreciable change in appearance, quality, and food value.

Copies of this leaflet are available free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

Institute of Food Technologists

THE Institute of Food Technologists will hold its Decennial Conference from May 21 to 25, 1950 in the Edgewater Beach Hotel, Chicago. The Institute noted that its first conference was held there in 1940 when its membership consisted of about 700 food technologists. The Institute now has 3,000 members. For the Decennial Conference, it is planned to extend invitations to outstanding leaders in finance and industry to attend a special luncheon. The luncheon will be followed by an address by an international banker.

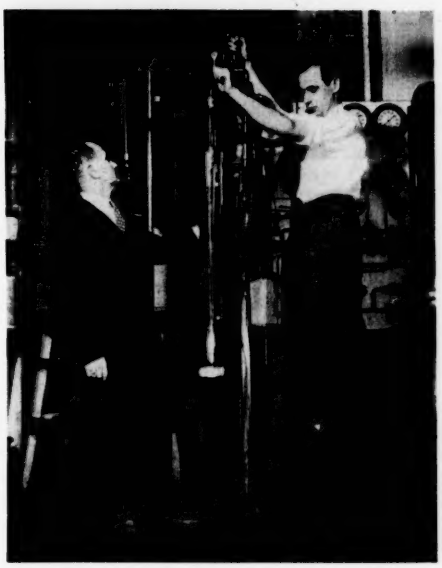
Sunkist to Make Frozen Concentrate

THE Exchange Orange Products Co., Los Angeles, Calif., largest citrus processing plant in California, will substantially expand facilities to start production of frozen orange concentrate and increase production of other high quality orange juice products, Paul S. Armstrong, general manager of the California Fruit Growers Exchange, has announced.

"This will be accomplished within the existing capital structure of the Exchange Orange Products Company and will involve no additional assessment. It will enable the exchange to utilize fruit in whatever forms will show the highest grower return," Mr. Armstrong stated following the action of the Sunkist board of directors in approving the expansion.

Frozen orange concentrate is a comparatively new product, first produced in Florida in 1947 and has made rapid strides in consumer acceptance. Most of the production of this product this year came from Florida because very little California fruit was suitable for this use because of unusually low sugar content this year.

Low Temperature Research Laboratory Achieves Lowest Temperature



The Cryogenic Laboratory at Ohio State University, Columbus, Ohio, has attained the almost impossible by creating or achieving a .05 degree above absolute zero cold. The picture above shows Dr. Herrick L. Johnston, director of the laboratory and Dr. Probst, research associate in chemistry with helium liquefier. The laboratory has facilities for the liquefaction of hydrogen and helium that are among the largest and finest anywhere. It has secured a 1200 KW motor generator and as soon as it is installed the generator will provide the power for the large electro magnet with which the Cryogenic Laboratory expects to produce temperatures within 3/1000th of a degree of absolute zero.

New York City Conserves Water

IN A move designed to conserve ultimately many billions of gallons of water every season, New York City has announced (January 4) new restrictions governing air conditioning and refrigeration units. New air conditioning and refrigeration units using water at the rate of six to 50 gallons a minute must use recirculated water under the new rules. Heretofore, only units using above 50 gallons a minute were subject to this requirement.

Although the new regulations are not retroactive, after next May 1 any non-recirculating air conditioning or refrigeration unit using more than six gallons a minute will be adjudged a water waster. In the event of any critical water shortage next summer, a development regarded as at least possible in view of the present situation, owners of such non-recirculating units may have their water shut off it was warned.

There are 7,000 to 8,000 air conditioning and refrigeration units in New York City, about 4,000 of which are of the three to 25-ton types using between six and 50 gallons of water a minute when in operation, it was estimated by Stephen J. Carney, city commissioner of water supply, gas and electricity. Carney said that air conditioning has become a major problem to his department in the last three years. In 1947 a total of 274 permits were issued for air conditioning installations. In 1948 this number jumped to 1,521 and in 1949 receded slightly to 1,469.

It was estimated that air conditioners and refrigerators employing non-recirculated water last summer used 100,000,000 gallons of water a day for a 110-day warm-weather season, or a total of 11,000,000,000 gallons of water. Without the new restrictions, Carney said, the amount of water probably would be even greater during the coming summer. "While under the new rules we cannot forbid the use of existing units using up to 50 gallons of water per minute," Carney declared, "we hope to persuade owners that it will be to their advantage to convert to the recirculating types as soon as possible. Tne cost incurred by such conversions will be offset by their metered water savings over two to three years."

Ormonds J. Burke, chief of the city bureau of water register, said that the new air conditioning restrictions could not fairly have been introduced prior to this year because of the danger of creating a monopoly for one manufacturer of the required equipment. Now, however, there are six or seven such concerns, affording competition, he said. It was noted that the type of equipment affected by the new rules is used mainly by ballrooms, taverns and similar places. Large office buildings, department stores and theaters use up to 75-ton units.

In order to curb the water used by existing non-recirculating units of all sizes, the new rules provide that all such equipment shall be provided with an automatic supply regulating device limiting the flow of water "in relation to the condenser temperature reduction requirements of the apparatus." In no case, it is provided, shall the equipment use more than two gallons per minute per ton capacity.

Ruling Issued

The amended rules, issued by Steven J. Carney, Commissioner of the Department of Water Supply, Gas and Electricity, specifically covering air conditioning and refrigeration are as follows:

145. No New installation of refrigeration and/or air conditioning equipment requiring the use of water shall be installed on any premises supplied from the municipal system until a permit authorizing such installation has been issued by the department to the installer.

Applications for permits for refrigeration and/or air conditioning to be installed shall specify the information requested on the application. Approved copy of the application will be returned to serve as the permit.

Where the minimum rate of water required for the operation of the apparatus exceeds one-half gallon per minute, the supply shall be metered.

Where the minimum rate of water does not exceed one-half gallon per minute, the supply shall be metered or charged for on an annual rate basis subject to the discretion of the department.

146. All installations of any individual or collective system of refrigeration and/or air conditioning equipment in any premises for a single consumer shall be installed under the following specifications:

a. All installations of any individual or collective system of refrigeration and/or air conditioning equipment of three tons and over shall be equipped with a water conserving device such as economizer, evaporative condenser, water cooling tower or similar apparatus, which device shall not consume for make-up purposes in excess of five per cent of the consumption that would normally be used without such device.

b. All new installations of refrigeration and/or air conditioning equipment under three tons and all exisiting equipment of all sizes, not using recirculated water shall be provided with automatic water supply regulating device so as to limit the flow of water in relation to the condenser temperature reduction requirements of the apparatus. In no case shall the equipment use in excess of two gallons per minute per ton capacity.

147. Each direct water connection to a refrigerating and/or air conditioning unit using water for cooling purposes shall be equipped with a check valve, except in installations where the water supply piping has no contact with the refrigerant. This will be the case where two substantial and independant wall thicknesses of metal separate the refrigerant from the city water supply.

Refrigerating and/or air conditioning units with a capacity of more than twenty pounds of refrigerant shall be provided with a relief valve installed on the outlet side of the check valve of the water supply connection, such relief valve being set at five pounds above the maximum water pressure at the point of installation.

Amana Refrigeration Plant Sold

THE refrigeration manufacturing plant of the Amana Colony at Amana, Iowa has been sold to a group of men headed by Howard Hall, Cedar Rapids manufacturing company executive. The purchase price was reported to be about $1,100,000. The plant makes air conditioning equipment and a line of refrigerators. A new firm, Amana Refrigeration, Inc., has been incorporated, a board of directors set up and officers elected. Mr. Hall is president of the new concern.

Officials of the Amana colony said in reference to the sale that the business had grown to such proportions that the society wished to relieve itself of further responsibility for plant operations and possible necessary expansion. The Amana colony was founded 90 years ago by a group of German settlers on a community or "share and share" alike basis.

Refrigeration Plant to Cool Concrete

A COOLING plant to be used mainly for temperature control of placed mass concrete in the construction of Detroit Dam located on the Santiam River, near Detroit, Ore., will be installed by Consolidated Builders, Inc., of Mill City, Ore. The plant will have a capacity in excess of 700 tons. Contract for installation has been awarded to Lewis Refrigeration & Supply Co., Seattle, Wash., representatives of the Frick Co., Waynesboro, Pa.

Engineering in Great Britain

(Continued from page 48)

My observation is that their research men know much more about what is going on in the U. S. research laboratories than we know about them. In highway construction, in heating and in housing, they would quote to me the findings of our leading research institutions of the United States. They are much more aware of the research bulletins of our national laboratories than most of those of us within our own boundaries.

We can expect always good competition and good sportsmanship from the British in technical research and production. They are an industrial nation and will proudly defend their position.

Training Classes Increase Sales for Fruit and Vegetable Retailers

TRAINING classes for retailers of fresh fruits and vegetables, conducted under authority of the Research and Marketing Act, have resulted in increased sales for 96 per cent and reduced spoilage for 95 per cent of the stores reporting results to the Fruit and Vegetable Branch of the Production and Marketing Administration, U. S. Department of Agriculture. More than 14,000 persons, including retailers and their employees, have taken the training, and additional classes are being instituted in numerous cities. Reports from 1,881 retail stores, each of which sent one or more persons to the training classes during the first year of their operation, were used as the basis for evaluating the program.

Classes are conducted by the United Fresh Fruit and Vegetable Association under contract with the Department of Agriculture. Retailers are taught methods of preparing fresh fruits and vegetables for sale, methods of display, care of the produce both during the day and over night, efficient handling techniques, and other practices that improve their merchandising and present better products to consumers.

Principles Taught

Of 11 important principles or practices taught in the classes, those most widely adopted by trainees were: Improved trimming of vegetables, by 98 per cent of those who had not previously followed the recommended practices; planned color contrast in displays, 89 per cent; and recommended practices in watering produce on display, 87 per cent. Six other practices were adopted by 60 to 70 per cent; and only 2 were adopted by less than 50 per cent.

As a result of the training, more than 45 per cent of the reporting retailers said they had renovated or were remodeling their produce departments. The changes ranged from minor improvements to remodeling of the entire store. About 43 per cent of those reporting such changes said they were adding new display racks equipped with drains, 16 per cent reported remodeling their present racks, and 8 per cent installed refrigerated racks.

Retailers who took the training course were asked to make suggestions for its improvement. Leading suggestions were that the course be repeated in each location once a year, as a refresher and for new trainees, and that growers and shippers be invited to attend the classes; and that the course be lengthened with more time spent on each phase. The course now consists of one day of intensive training, during which the trainees are shown recommended methods, and also actually trim and handle the produce themselves and build displays so that they learn by doing. In addition, trainees receive some instruction in buying, pricing, and record keeping.

A.S.H.V.E. Announces New Officers

THE election of Lester T. Avery, president of the Avery Engineering Co. of Cleveland, as the 1950 president of the American Society of Heating and Ventilating Engineers was announced at the society's 56th annual meeting at Dallas, Tex., January 24. Other officers elected were: First vice president, Lauren E. Seeley, dean of the College of Technology, University of New Hampshire, Durham, N. H.; second vice president, Ernest Szekely, president, Bayley Blower Co., Milwaukee, Wis.; treasurer, Reg F. Taylor, consulting engineer, Houston, Texas. Mr. Avery succeeds Alfred E. Stacey, Jr., director of application engineering for the Carrier Corporation, Syracuse, N. Y.

Mr. Avery was born in Painesville, Ohio, in 1896. He was graduated in 1918 from the Case School of Applied Science, Cleveland, now known as Case Institute of Technology, with a B.S. degree, and served in the U. S. Naval Reserve during World War I. In 1921 he became district manager of the American Carbonic Machinery Co., in Cleveland, and later in Chicago. He founded the Avery Engineering Co., in Cleveland, in 1929. He is also president of the newly formed Avery Products Co., and is a registered professional engineer for the state of Ohio.

A member of the ASHVE since 1934, Mr. Avery has been active in the affairs of the society as well as in the activities of the Northern Ohio Chapter of which he was president in 1936-37. He is a member of the American Society of Refrigerating Engineers, Cleveland Rotary Club, Cleveland Chamber of Commerce, Case Alumni Association, Cleveland Engineering Society, Air Conditioning Association, Inc., of Cleveland.

Lauren E. Seeley is a graduate of Yale University, and served as regional adviser in Connecticut and Rhode Island for the engineering, science and management World War II training program of the U. S. Office of Education, and was special consultant to the OPA on fuel oil and coal rationing problems for a number of government agencies, trade associations and private firms.

Ernest Szekely, president of the Bayley Blower Co., was graduated in 1910 from the University of Budapest with an M.E. degree. In 1912 he became associated with Jeffrey Manufacturing Co. and Guarantee Construction Co., New York. In 1914 he joined the staff of the American Blower Co., Detroit, as research engineer, and in 1928 became chief engineer of the company he now heads.

Reactivated Carbon Available to Pacific Coast Users

AN ARTICLE in the November issue, in discussing reactivating carbon, indicated that Pacific coast users of this material found it necessary to make shipments to far eastern points in order to obtain satisfactory service. It has now been called to our attention that the R. T. Collier Corporation, of Alviso, Calif., just outside of Santa Clara, is a large manufacturer of gas absorbent active carbon for air conditioning purification, taking out odors from the air stream. Their hard, dense granular carbon, The Collier Corporation points out, compares with the highest grade manufactured. Collier carbon is also suited for water purification in commercial or home filters.

R. T. Collier, president of the company, in talking to an ICE AND REFRIGERATION reporter, stated that while his company had every facility for quick, dependable service on reactivating, that it was questionable whether west coast users, particularly, would find it advantageous to take advantage of this service in view of the extremely modest cost of "new" Collier gas absorbent active carbon. The Collier plant is geared up for big capacity production on an economical basis.

New Ice Cream Plant Opens

Engine and compressor room in new ice cream plant of Carnation Company, Oakland, Calif. Six York 10x10 compressors and two 10x15 boosters are shown. This plant can pasteurize and cool milk at the rate of 40,000 lbs. an hour and freeze 1,500 gallons of ice cream an hour at the same time. From the boiler and compressor room is piped liquid ammonia, 180 F. hot water, steam, 35 F. cold water, city water and liquid sugar to all points in the plant.

Sales and Reorganizations

Sonoma, Calif.—Beretta's Ice Plant was recently sold by Angelo and Angela Beretta to Frank Pisa of San Francisco. In addition to the ice business which has a quantity of modern equipment, beer and soft drinks are also sold.

Anderson, Ind.—The Emge Packing Co. of Fort Branch has purchased the Duffey Packing Co. here and will continue to operate the meat packing plant under the same name.

Crawfordsville, Ind.—Purchase of the Crawfordsville Ice and Cold Storage Co. by the Polar Ice and Fuel Co. of Indianapolis, was announced recently by Henry L. Dithmer, president of the purchasing firm. Dithmer said the Crawfordsville building will be dismantled for the erection of a new, modern ice plant. The Crawfordsville Ice and Cold Storage company was originally founded 75 years ago by Wm. Martin, father of the late Wm. K. Martin.

Franklin, Ind.—Purchase of the Edgar L. Brown Ice & Coal Co. plant at 170 North Jackson St., by the Johnson County Rural Electric Membership Corporation (REMC) was disclosed recently. The building is to be dismantled.

Hagerstown, Ind.—Earl Bond, who has been in the ice business here for the last fifteen years, has sold his business to Delmar McCaslin of New Castle. The new owner has been associated with the Consumers Ice & Fuel Co. in New Castle for the last eight years.

Fredonia, N. Y.—The Buffalo Frosted Foods Inc., Buffalo, N. Y., has purchased the former B & F Canners Cooperative plant here for the purpose of canning and freezing fruits and vegetables.

Ontaria, Ore.—An organization here under the leadership of Nephi and Golden Grigg is leasing the Bridgford food freezing plant through the Reconstruction Finance Corp. It is planned that 10,000 tons of corn and about 2,000 tons of carrots will be processed there next season.

Icy Item

San Francisco, Calif.—Crystal Ice and Cold Storage Warehouse has been authorized to issue and sell 25 shares of its capital stock at $100 a share.

Fires and Accidents

Fullerton, Calif.—Fire razed the Snyder and Sons Fruit Packing Plant. The loss was unofficially estimated at $500,000. Firemen put a heavy concentration of apparatus at the Crystal Ice Plant nearby for fear the flames might cause an ammonia leak.

Kelowna, B. C., Canada—A disastrous fire attacked the Rutland Cold Storage plant here causing damage estimated at close to $900,000. George Fitzgerald, president of the Kelowna Fruit Growers' Exchange said the amount includes the 144,000 packed boxes of apples and several thousand more loose. Believed to have been caused by a water shortage, cold weather and a short circuit in the electrical power line, the blaze defeated firemen's efforts who were forced to use ineffectual hand equipment.

Fort Myers, Fla.—The Florida Power & Light Plant caught fire and exploded Sunday, December 25, Tanks of ammonia gas and fuel oil blew up and rocked the city, hurling debris for blocks and left the surrounding area without power for almost ten hours. Damage was approximately $250,000, but there were no casualities.

American Falls, Idaho—Minor damage was done to the Thornhill Cold Storage plant on Harrison St. in a recent fire which totally destroyed an adjoining frame house. Several items were removed from the storage building before any damage could be done.

Franklin, Ind.—Flames caused an estimated $1,500 damage at the old Brown Ice & Coal Co. plant at 170 N. Jackson St. The abandoned plant, purchased a few days pre vious to the fire by the Johnson county, REMC, was in the process of being wrecked. It is believed fire was caused by sparks from acetylene torches of the wreckers.

Newark, N. J.—A two-alarm fire, fed by tar paper and cork insulation materials blazed through an abandoned ice house at 105 Newark St. recently. Two firemen were blown from a 15-foot ladder while battling the flames which ruined the second story of the two-story frame structure. A backdraft engulfed them.

Clyde, N. Y.—The Grange League Federation cold storage warehouse was destroyed by fire recently, causing many farmers to lose their entire years' fruit crop. High winds were blamed for toppling an electrical transformer which touched off the blaze. Besides destroying large quantities of stored fruit, the fire also demolished stores of eggs and frozen foods.

Scranton, Pa.—The Mountain Springs Ice Co. storage building at Splash Dam near Harveys Lake, Luzerne County, owned by R. A. Davis, Scranton and Wilkes-Barre coal and ice dealer, was destroyed by fire recently. The ice company storage building 1.000 ft. long, and 50 to 60 ft. wide was burned to the ground. No estimate of damage were available.

Enterprise, Ore.—Fire which broke out in the Dutli Cold Storage Plant, destroyed four business houses here. An ammonia tank exploded in the cold storage plant and the flames spread swiftly through the plant and lockers, and into adjoining shops.

Harrisonburg, Va.—A boiler exploded recently in the engine room of the Cassco Ice Co. on South Liberty St. The blast shook buildings for several blocks and Liberty St. was showered wih broken glass from the windows of the engine room. The boiler is one that is used to heat water for loosening the ice in the cans after it has been frozen. The blast tore off several pipes leading to and from the boiler, and hurled hot water and steam over much of the engine room. The exact cause of the explosion has not been determined.

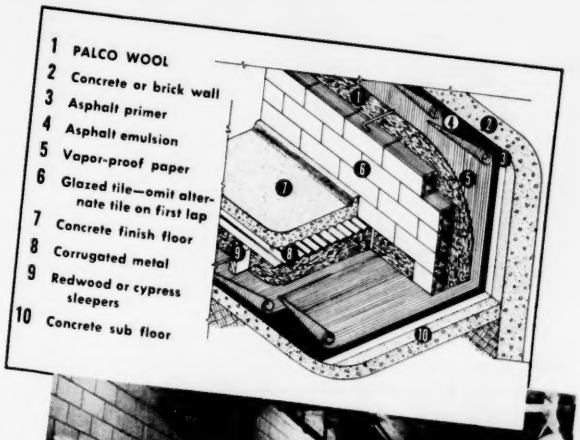
Wheeling, W. Va.—The Koehnline Ice plant at Aetnaville was damaged to the extent of an estimated $50,000 by a fire recently. Ice and fear of exploding ammonia tanks greatly hampered Bridgeport and Martins Ferry firemen as they fought the blaze in 15 degree temperature. The damage was confined to the rear portion of the building where the ice-making equipment was located.

INSTALLATION FILE NO. 1002

How to get maximum efficiency with PALCO INSULATION WOOL

Recommended

PACKING PLANT, MASONRY CONSTRUCTION, TILE FINISH—Inside face of brick or concrete floor, wall, and ceiling should be thoroughly cleaned, then vapor-proofed with asphalt primer, asphalt emulsion, and vapor-proof paper with 4-inch laps cemented with asphalt emulsion. If metal ties furnish lateral support for interior tile wall, seal vapor-proof paper at each tie with asphalt emulsion.
Install PALCO WOOL INSULATION between sleeper in floor prior to placing corrugated metal subfloor – apply in walls as laying of glazed tile progresses – apply in ceiling as metal lath is installed in approximately two foot courses. Tile should be laid in rich Portland cement mortar with neat struck joints. Partition walls consist of two layers of tile spaced for proper thickness of PALCO WOOL.


1 PALCO WOOL
2 Concrete or brick wall
3 Asphalt primer
4 Asphalt emulsion
5 Vapor-proof paper
6 Glazed tile—omit alternate tile on first lap
7 Concrete finish floor
8 Corrugated metal
9 Redwood or cypress sleepers
10 Concrete sub floor

Applied

FRY & COMPANY MEAT PACKING PLANT SEATTLE, WASHINGTON—Moisture resistance, odor-proof and non-settling qualities of PALCO WOOL make it an ideal insulation for all food storage plants. Thermal conductivity of only .255 B.t.u. assures operating economy and consistent temperature control. Patented "Saferizing" process adds flame-proofed protection.

FROM NATURE'S INSULATION · AGE OLD REDWOOD BARK · FLAMEPROOFED

Mail attached coupon today for more detailed information.

THE PACIFIC LUMBER COMPANY
100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA
5225 WILSHIRE BLVD., LOS ANGELES 36, CALIFORNIA
35 EAST WACKER DRIVE, CHICAGO 1, ILLINOIS

THE PACIFIC LUMBER COMPANY
100 BUSH STREET
SAN FRANCISCO 4, CALIFORNIA

Please send me without obligation:

☐ PALCO WOOL COLD STORAGE MANUAL
☐ LOCKER PLANT PLAN AND CONSTRUCTION MANUAL

Name_____
Title_____
Company_____
Street_____
City_____ Zone____ State_____

002-IR

COMING CONVENTIONS

OHIO ASSOCIATION OF ICE INDUSTRIES
February 27-28, 1950
Deshler-Wallick Hotel, Columbus, Ohio
GUY W. JACOBS, Secretary

MICHIGAN ICE INDUSTRIES ASSOCIATION
March 2-3, 1950
Hotel Morton, Grand Rapids, Mich.
EDWARD W. JACKSON, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 6-7, 1950
Sir Walter Hotel, Raleigh, N. C.
LEWIS H. POWELL, Secy.-Treas.

INDIANA ASSOCIATION OF ICE INDUSTRIES
March 6-8, 1950
Lincoln Hotel, Indianapolis, Ind.
ROBT. W. WALTON, Secretary

KANSAS ASSOCIATION OF ICE INDUSTRIES
March 27-28, 1950
Allis Hotel, Wichita, Kans.
C. A. BERKIHISER, Secretary

EASTERN STATES ICE ASSOCIATION
April 12-14, 1950
Haddon Hall Hotel, Atlantic City, N. J.
SAMUEL FREER, Secretary

ACRMA Promotes Overseas Markets for Air Conditioning

THE educational program of the Air Conditioning and Refrigerating Machinery Association to overseas markets on the necessity for refrigeration is being continued and expanded. The program, emphasizing the essentiality of refrigeration to the individual and national welfare, began with the publication of the booklet "To Your Health," which had excellent reception.

The ACRMA Foreign Trade Committee, at its December meeting in New York, decided that the major educational and sales promotion activity of the group in 1950 would be in the form of monthly news letters. These will go to foreign newspapers and periodicals and other news agencies, as well as to ACRMA member-company sales outlets throughout the world. The news letters, under the title, "Air Conditioning and Refrigeration Overseas Bulletin," will tell, in "case history" style, of various types of application of the industry's products. This activity may be supplemented by other cooperative sales promotion efforts during the year.

The Foreign Trade Committee will be headed by W. J. Neylan of Servel, Inc., as chairman and Ken L. Crapeau of Chrysler Corp. as vice-chairman. Mr. Neylan replaces A. J. Dangoia of Westinghouse International who had served as committee chairman since 1947.

Natural Ice

Grand Junction, Colo.—Shipments of natural ice, according to a news report have been delayed this season due to the mild temperatures prevailing in the Mountain areas where the ice is harvested each winter. It is expected to be late in the winter before the ice harvest opens here. Approximately 30,000 tons of ice are harvested each year and moved to various points by special ice trains for use in icing refrigerated cars. The harvesting season normally opens shortly after Christmas.

Ortonville, Minn.—The ice harvest has begun on Big Stone Lake nearby. Some 18,000 tons of the ice are to go to the Milwaukee Railroad.

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Mount Taylor, Secretary, 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres., Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Emerson A. Brandt, Sec'y, 435 N. Waller Ave., Chicago 44, Ill.

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
Jack L. Dawson, 461 Market St., San Francisco, Calif.

CANADIAN ASSOCIATION OF ICE INDUSTRIES
Mrs. Mildred E. Croft, Secretary, 317 Eglinton Ave., Toronto, Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary, Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
Samuel Freer, Secy.-Treas., 12 So. 12th St., Philadelphia, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary, 1951 Silver St., Jacksonville, Fla.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
W. D. Wright, Secretary, Clinton Pure Ice Co., Clinton, Ill.

INDIANA ASSOCIATION OF ICE INDUSTRIES
Robert W. Walton, Secretary, Board of Trade Bldg., Indianapolis, Ind.

KANSAS ASSOCIATION OF ICE INDUSTRIES
C. A. Berkihiser, Manhattan Ice & Cold Stg. Co., Manhattan, Kans.

KENTUCKY ICE MANUFACTURERS' ASSOCIATION
R. T. King, Secretary, 429 S. Seventh St., Louisville, Ky.

MICHIGAN ICE INDUSTRIES ASSOCIATION
Edward W. Jackson, Secretary, 131 E. Kalamazoo Ave., Kalamazoo, Mich.

MISSOURI ICE MANUFACTURERS' ASSOCIATION
A. V. Esphorst, Secretary, 3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASSOCIATION OF ICE INDUSTRIES
J. R. Espy, Secretary, Espy Ice Co., 2229 - 15th St., Denver, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary, W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary, 419 Boyleston St., Boston, Mass.

NEW YORK STATE ASSOCIATION OF REFRIGERATED WAREHOUSES
Chas. G. Arbe, 101 Columbia St., Buffalo 5, N. Y.

NORTH CAROLINA ICE ASSOCIATION
Lewis H. Powell, Secretary, Capital Ice & Coal Co., Raleigh, N. C.

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
D. D. Stewart, Secretary, American Bank Bldg., Seattle, Wash.

OHIO ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secretary, The Steubenville Ice Co., Steubenville, Ohio

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
W. A. Hadley, Secretary, 242 Key Bldg., Oklahoma City, Okla.

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
461 Market St., San Francisco, Calif.

SOUTH CAROLINA ICE MANUFACTURER'S ASSOCIATION
Geo. L. English, Secretary, P. O. Box 603, Columbia, S. C.

SOUTHERN ICE EXCHANGE
Wilshire Riley, Secy.-Counsel, 421 Rhodes Building, Atlanta, Georgia

SOUTHWESTERN ICE MANUFACTURERS ASSO.
P. A. Weatherred, Secy. Counsel, Mercantile Bank Bldg., Dallas, Texas

TENNESSEE ICE MANUFACTURERS' ASSOCIATION
W. E. Harlan, Secretary, Mt. Pleasant Ice Co., Mt. Pleasant, Tenn.

TRI-STATE ASSOCIATION OF ICE INDUSTRIES
L. R. Girton, Secretary, 260 Boyce-Greeley Bldg., Sioux Falls, S. D.

VIRGINIA ICE MANUFACTURERS' ASSOCIATION
H. H. Snyder, Secretary, Alexandria, Va.

WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
E. Dana Smith, Secy., Diamond Ice & Coal Co., Charleston, W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary, 1300 East Locust St., Milwaukee, Wis.

New Incorporation

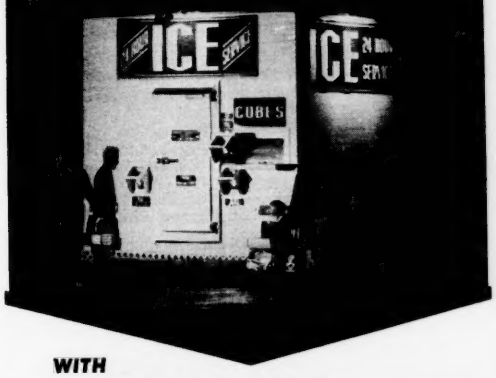
El Dorado, Ark.—Atlas Heating & Air Conditioning Service Co., here, has obtained a charter from the secretary of state. Authorized capital stock is $20,000. Sarah H. Rainwater, Alvie D. Rainwater, Rex A. Barrow, Jr., and Rex A. Barrow, Sr., were listed as the incorporators.

Howard, Kans.—Howard Ice Co. Inc., was granted a state charter recently by the office of the secretary of state, for making and selling ice at wholesale and retail. Capitalization of $25,000 was authorized.

Buffalo, New York—Merwin, Lesswing, Rothfus & Burman, attorneys in the White Building, Buffalo, New York, filed articles of incorporation with the secretary of state, Albany, January 5, for Crystal Ice & Storage Co., consolidation of Crystal Ice and Storage Co. and Crystal Ice Delivery Co. Directors and subscribers were not stated. Capital stock was listed as $150,000.

Slash Distribution Costs ..Step Up Sales Volume

ICE CUBES *Automatically*



WITH

STURDY-BUILT REFRIGERATED ICE VENDING STATIONS

More and more ice merchandisers throughout the nation are using automatic ice vending stations to turn "off season" slumps into higher profit periods.

By trimming costly off season truck deliveries to a minimum Sturdy-Built Stations carry the winter load and they do it more economically. Sturdy-Built Stations serve the occasional ice users who account for 27% of all station sales; a market which hitherto has been untapped by the ice industry.

Progressive ice men are out to capture this extra 27% as well as the *"after hour"* customers. 45% of Sturdy-Built sales are made between 4:00 P.M. and 8:00 P.M.

It's been tried and has been proved — Sturdy-Built sells more ice to more people — more economically — which means greater profits to you, for years to come.

Phone, Wire or Write for Detailed Information.

IN THE EAST

REFRIGERATED STURDY-BUILT ICE VENDING STATIONS

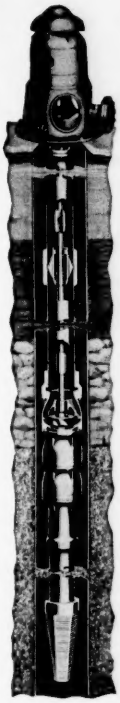
F. B. DICKINSON CO.,
Highland Park Station
Des Moines, Iowa

IN THE WEST

S&S ICE VENDING MACHINES

S&S VENDING MACHINE CO.
670 Lincoln Avenue
San Jose, California

"High water Costs are Biting into our Profits!"



That's what many plant officials have exclaimed when they discovered what water was costing their companies.

They are among an increasing number of officials who have ruled out purchasing water at high rates when they checked up on the cost-saving advantages of Deming Deep Well Turbine Pumps.

How about YOUR company? Are YOUR water rates in line? Or is water costing you more than is necessary?

A Deming Distributor is near you to help you determine the right answers to those questions. There's no obligation on your part in this consulting service.

Deming Deep Well Turbine Pumps are WATER LUBRICATED. That feature protects the water from contamination by oil or grease lubricants.

Capacities range up to 3000 gallons per minute which gives a wide selection to meet most requirements.

BULLETIN 4700-8
Send for this 20-page illustrated bulletin which gives complete details about Deming Deep Well Turbine Pumps.

THE DEMING CO.
529 Broadway
SALEM, OHIO

Deming Pumps

NEW PLANTS AND IMPROVEMENTS

Information pertaining to proposed new plants utilizing refrigerating equipment, as well as additions, improvements, and rehabilitation of existing plants. News regarding such new plants and additions is invited for publication in this department.

ARKANSAS

Batesville, Ark.—The retail business of the Pure Ice Co. has been moved to its new plant at Laurence and Allen Sts. The new plant was constructed in 1948 and has been in operation since that time but it had handled no retail business. The old plant on Lower Main St. will continue to make ice.

CALIFORNIA

Los Angeles, Calif.—John Morrell & Company's new $250,000 addition to their branch here was dedicated recently. It has freezer capacity for 75,000 lbs. of meat in addition to refrigerated storerooms for canned meats and provisions.

Manteca, Calif.—Further improvements are being made by the Eckert Engineering Corp. at the old Valley Express property on Highway 99. The Eckert firm purchased the property a few months ago and with extensive remodeling converted it into a cold storage plant, as reported in the November issue of ICE AND REFRIGERATION. The company is now installing a cold storage tunnel under the floor, 10 ft. wide, 10 ft. high and 60 ft. long, with an overhead air duct which will deliver the cold air down to the tunnel. When this is completed the temperature can be held down to as low as 50 degrees below zero.

San Francisco, Calif.— City Ice Delivery has recently installed another S & S Ice Vending Station, Model 20-B.

San Francisco, Calif.—The Borden Co. plans a capital expenditures program of about $15,600,000 this year, chiefly for plant modernization and replacement of equipment, Theodore G. Montague, president, recently announced.

COLORADO

Pueblo, Colo.—The Mountain Ice & Coal Co. recently completed a modernization program amounting to approximately $35,000 using General Electric equipment. Synchronous and induction motors to drive York compressors, replaced the old steam engine-drive compressors. Also a G-E low voltage drawout type distribution switchgear unit which supplies power to the entire plant for all purposes was installed.

FLORIDA

Plant City, Fla.—A $10,000 expansion program is under way at the Arctic Ice Company's plant on Tever St., Joe R. Gramling, president, announced. Now under construction is a new section which will provide about 40 per cent more storage space. The floor will have a four-inch concrete base, covered with six inches of cork, covered by another four inches of concrete, over which will be two inches of wood. The walls will be of concrete block covered with four inches of cork and the ceiling will have four inches of cork.

GEORGIA

Metter, Ga.—Announcement was recently made of the opening of the Candler Ice & Meat Curing Plant. J. Foster Williams & Son, are the owners and operators. The opening of this new plant gives Metter two modern ice and meat curing plants.

INDIANA

East Chicago, Ind.—City Ice Supply has installed another Sturdy-Built ice vending station. F. B. Dickinson & Co. supplied the unit.

Indianapolis, Ind.—The Irvington Ice & Coal Co. has established another conveniently located 24-hour Sturdy-Built ice vending station.

KANSAS

Topeka, Kans.—City Ice Company, going out after those extra sales to occasional ice customers, is now operating two new Sturdy-Built Modern 20-C ice vending stations.

MAINE

Caribou, Me.—Birds-Eye Snider Div. of General Foods Corp. announced recently that a new plant designed exclusively for production of quick-frozen French fried potatoes has been officially opened here. The plant was so constructed that it readily can be enlarged. It will employ about 150 persons, officials said.

MEXICO

El Golfo, Sonora, Mexico—Construction work is proceeding at a rapid pace on the new freezing plant here, near the Port of Santa Clara. Machinery is on hand and is being installed.

Hermosillo, Sonora, Mexico—The Hermosillo Packing Plant has resumed activities following a contract with the United States government for 5,000,000 lbs. of canned meat. The Agua Prieta plant has also been reopened with a similar contract. It is estimated that 22,000 head of cattle will be slaughtered here to fulfill the new contract.

NEW YORK

Buffalo, N. Y.—The Gerry Provision Company, 663 Seneca St., will install new freezers and cooling equipment in a $100,000 expansion program at its plant here. The freezers will be for beef, pork, lamb and poultry. The company has taken a 20-year lease on space in the Seneca Warehouse & Industrial Center and will double the floor area used for its meat and provision business.

OHIO

Dayton, Ohio—Terminal Ice & Cold Storage Company has added another Sturdy-Built ice vending station. The unit is equipped with three S & S vending machines for selling block ice in two sizes, and 25 lb. bags of processed packaged ice.

OREGON

Pendleton, Ore.—A building permit has been issued for the erection of a cold storage warehouse here.

TEXAS

Huntington, Tex.—The Huntington Ice Service recently opened its new 12-ton ice plant. Arthur and James Bryan are the owners who believe their new plant will adequately serve Huntington and Zavaella.

Mount Pleasant, Tex.—Northeast Texas Ice Company has recently installed a Sturdy-Built ice vending station, Model 16-B.

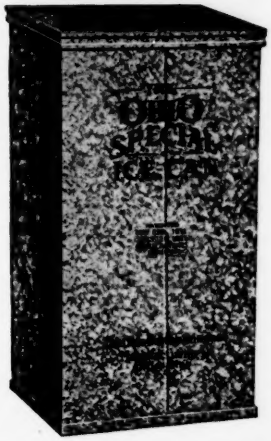
Rusk, Tex.—The completion of a 25-ton ice plant has been announced by the Southwestern Electric Service Co., replacing a 15-ton plant located in another part of this city. The plant is equipped with one 6x6 in., one 7x7 in., and one 10x10 in. electric driven compressors, and the tank contains 320. cans.

WASHINGTON

Seattle, Wash.—Extensive damage to the Port of Seattle's cold storage facilities at its Spokane St. Terminal in the 1949 Earthquake has been repaired and the plant completely renovated. The renovating job cost $60,000. Additional plans call for spending $600,000 to expand fish house storage facilities, construction of a two-story warehouse with 20,000 ft. of cold storage floor area and expenditure of $100,000 for improveemnt of the Bell St. Terminal as a cold storage facility.

Seattle, Wash.—Contract for erection of a cooling plant having in excess of 700 tons refrigerating capacity has been awarded by Consolidated Builders, Inc. of Mill City, Ore. to Lewis Refrigeration & Supply Co., Seattle, Pacific Northwest representative of The Frick Co., Waynesboro, Pa. The plant will be used for temperature control of placed mass concrete in the construction of Detroit Dam.

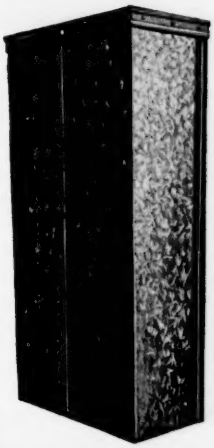
OHIO SPECIAL ICE CANS



Double Riveted
Welded
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

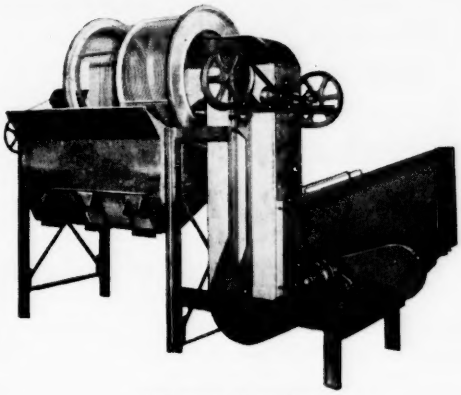
• • • • • • • • • • •

Industrial Trucks
and Trailers



THE OHIO GALVANIZING & MFG. CO.

NILES « « *Established 1902* » » OHIO



Lilly ICIZER Model 13CE8
(Two Screens—Three Bins)
Base Ht. 8'—Width 4'
Length 11'3"
Capacity: 12-15 tons/hr.

SIZED ICE SELLS.....
builds year-round profits

Sized Ice sells—winter or summer. It's ready to use ice—the kind your customer wants.

Progressive ice men use LILLY ICIZERS — rugged construction — dependable operation — economical production of 100% salable Sized Ice — these features mean more profit — establish Lilly's leadership the country over.

Remember, whatever your plant capacity, Lilly can supply a machine to fit your exact needs.

Write, wire or phone today for catalog and complete information.

SCORING MACHINES
ICE PLANT AND DELIVERY SUPPLIES
"PENGUIN"
VENDING MACHINES—VENDING STATIONS
Write for literature and prices.

THE LILLY COMPANY
466 Union Avenue, Memphis 1, Tenn.

OBITUARY

Ernest Nalle

THE death of Ernest Nalle, president for many years of the Southern Ice & Cold Storage Company of San Antonio, Tex., occurred at a Dallas hospital on January 11, following an extended illness. He was 74 years old. Mr. Nalle was the son of a pioneer Austin family and was prominent in civic and business affairs of that city. Besides his interest in the ice company, he was vice-president of the American National Bank of Austin and president of the Nalle & Company lumber firm for many years.

WAYNE C. BOWMAN, superintendent of the Klages Coal & Ice Co., Akron, Ohio, died recently at Peoples Hospital following an illness of over three weeks. He was 54 years old. Mr. Bowman was born in Wooster but had lived in Akron since he was two years old. Surviving are his widow, Mrs. Anna Bowman, three sons, Jack, Walter and Richard and one daughter.

FREDERICK C. STEINHORST, retired vice president of Emil Steinhorst & Sons, Inc., Utica, N. Y., refrigeration and sheet metal specialty firm, died suddenly at Riviera Beach, Fla., on January 5. He had been in ill health for the past four years. Mr. Steinhorst had been with the Steinhorst firm since it was founded in 1908 until his retirement four years ago. He was 61.

JAMES T. JONES, assistant manager of the Glynn Ice Co., Brunswick, Ga., died at Lawson General hospital, Atlanta, December 23, following a short illness. He was 32 years old. Mr. Jones was associated with the company prior to service in World War II and upon his return was named assistant manager.

L. L. DAVIS, owner and manager of the Cairo (Ga.) Ice Company and the Cairo Freezer Locker plant died in an Albany hospital December 11 as the result of injuries sustained in an automobile accident on the way home from a football game. He was 39 years old. Mrs. Davis, also injured, is still a patient in the hospital.

FRANK J. KRUMPELMAN, an ice dealer in Covington, Ky., for over fifty years, died November 23 following a short illness. He was 74 years old. Surviving are his widow, Mrs. Josephine Krumpelman, a son, Frank, and three daughters.

FRANK MCNELLIS, president since 1914 of the Imperial Brass Mfg. Co., Chicago, died January 16 at the age of 70. With his father, Charles, he founded the firm in 1905 and developed it into a leading manufacturer of tube fittings and working tools. He became president upon his father's death.

MRS. WILLIAM J. WILLIAMSON, whose husband is president of the Cataract Ice Company, Niagara Falls, N. Y., died December 28 after being admitted to the Mayo Clinic for treatment about a year ago.

PROTECT TANK TOPS • LIDS • WALLS MACHINERY • FLOORS AND OTHER SURFACES!

KEEP THEM CLEANER . . . They'll Even Last Longer When Properly Painted!

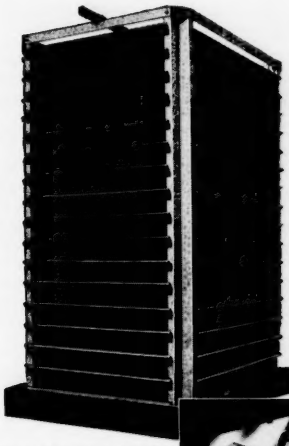
CSCO GREY PAINT Is Made Especially For Ice Plant Service

CSCO Can, Coil and Condenser Coating is a Black Phenolithic Compound . . .
Excellent for coating ice cans above or below brine levels. Also condensers and all other surfaces immersed in either brine or water or exposed to the atmosphere.

PACKAGED IN ALL SIZE CONTAINERS

GUARANTEED AS GOOD OR BETTER THAN ANY OTHER PAINT OR COATING ON THE MARKET OR YOUR MONEY REFUNDED

CHEMICAL SOLVENT COMPANY
3005—16th Street North Birmingham, Ala.



SLASH your cooling water cost

install a **Binks** *natural draft cooling tower*

You can cut your cooling water bill to almost nothing by installing a Binks Type "S" Natural Draft Cooling Tower. This type of tower is excellent where air movement is unrestricted*. You recirculate the same water over and over, passing it through the cooling tower each time. A small pumping cost replaces high water bills.

Binks Type "S" Cooling Towers are made in a variety of types and sizes, handling from 15 to 1200 gallons per minute with high efficiency. These towers will provide you with many years of trouble-free service.

ideal for many applications

Binks Type "S" Cooling Towers are the accepted standard for cooling condenser circulating water from refrigeration and air conditioning compressors...for cooling water-jacketed engines...or for low-cost cooling in many manufacturing processes where heat is dissipated by spraying water or other fluids.

**Ask about Binks Mechanical Draft Towers for locations where air movement is limited.*

Binks clog-proof Rotojet spray nozzles contribute much to the high efficiency of Binks towers. Their side-inlet, whirl-chamber design and precision manufacture assure maximum fluid break-up and long life.

Send today for FREE Bulletins

which give full information about Binks Type "S" Towers:

Bulletin 30—Single section towers
Bulletin 31—Multiple section towers
Bulletin 32—Large capacity towers
Bulletin 40—All Redwood towers

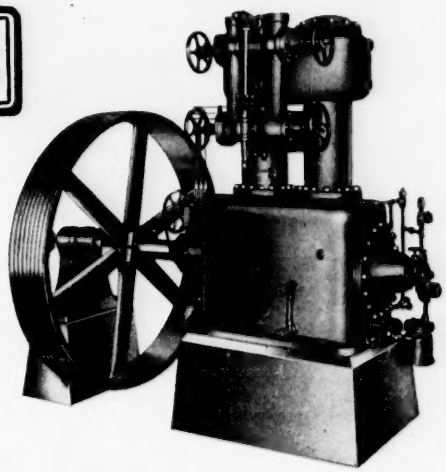
Please state how tower will be used, also capacity required.

THERE'S A BINKS TOWER FOR EVERY COOLING JOB

Binks MANUFACTURING COMPANY

REPRESENTATIVES IN ALL PRINCIPAL CITIES ■ 3130-38 CARROLL AVENUE, CHICAGO, ILL.

Sterling DEPENDABLE REFRIGERATION



The phrase "STERLING DEPENDABLE REFRIGERATION" is more than a slogan—it's a fact.

Built with rugged strength for endurance, with advanced design for efficiency and economy of operation, STERLING Ammonia Compressors are the product of more than fifty years of "know how" in the manufacturing of refrigeration machinery and equipment.

A complete range of sizes insures the correct compressor for each application.

Deliveries are, at present, current—most models of compressors are available from stock.

For complete information, see your nearest STERLING distributor, or write the factory.

REYNOLDS MANUFACTURING CO.

SPRINGFIELD *"Builders of Fine Refrigeration Equipment"* **MISSOURI**

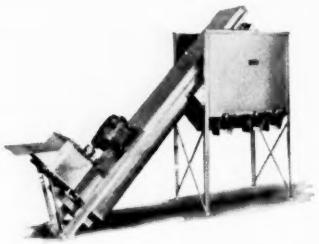
NEW AND IMPROVED EQUIPMENT

MACHINERY-APPLIANCES-PROCESSES

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

G-W Announces New Ice Sizer

A NEW ice sizer has been placed on the market by Gifford-Wood Co. of Hudson, N. Y., well-known manufacturers of a complete line of ice handling and processing equipment. Called the "Economiser," the new G-W sizer takes 50 lb. cakes and produces three grades of ice at an average rate of 200 lbs. per minute. The breaker can be adjusted to produce any proportion of the three grades to meet customers' requirements. Precision sizing control is obtained by an adjustable comb. The small diameter cylindrical picks are made of Hy-Ten processed steel for toughness, and to eliminate as much as possible the fine flaky product. All the steel parts of this new sizer which come in direct contact with the ice are galvanized.



New G-W. Economizer

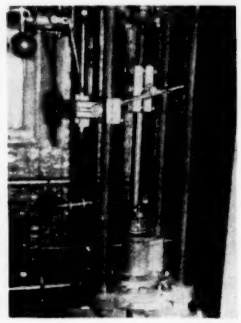
Operating upkeep is almost eliminated by the use of only two shafts operating in anti-friction, grease sealed ball bearings. Power is supplied to the breaker by a single 1½ hp. motor directly connected. Power screening is obtained through perforated plates, further eliminating the possibility of maintenance problems. Another of the outstanding features of the "Economiser" is its compactness and low headroom (2 ft. 4 in. wide; 10 ft. 9 in. long; 7 ft. 6 in. high). It is equipped with a bagging hopper and a bag spreader.

This machine was introduced at the annual convention of the National Association of Ice Industries and met with favorable comments from all who inspected it.

Further information may be had direct from the manufacturer upon request.

Super Scottsonizing Stainless Steel

IN ONE of America's leading packing plants, an 18-8 stainless steel piston on an aqua ammonia pump had a life of only 180 days. The stainless steel piston replacement was hardened by the Super Scottsonizing method. This shaft has been constantly in operation for 1145 days, a little over three years, and it is still operating satisfactorily, according to the plant management.



A view of aqua ammonia pump showing 18-8 stainless steel piston

Super Scottsonizing is a process of hardening stainless steel machine parts requiring precision tolerances up to two ten thousandths. It gives these parts a case of two to three thousandths with a Rockwell reading of 68 - 70 C. When stainless steel is processed in this manner it becomes hard enough to scratch a diamond and it can be used to cut ordinary glass.

While the case depth is light, it has exceptional wearing qualities. Super Scottsonizing prevents galling and metal retains most of its stainless qualities. This process opens many new fields for types 302, 303, 304, 316, 410, 416, 420 and 440 stainless steel. Its use is almost unlimited, including such industries as dairy, cheese and meat processing.

Further information on this process is provided in the booklet, "Super Scottsonizing", available upon request from C. U. Scott and Son, Inc., Rock Island, Ill.

Mills Introduces New Ice Cube Machine

AN ice cube machine is now in production at Mills Industries, Inc., Chicago, Ill., according to company officials. The machine is powered by a ⅓ hp. Condensing Unit and can be plugged into any convenient outlet without separate wiring. The Mills Ice Maker shown in the accompanying illustration is fully automatic and produces solid, crystal-clear ice in lengths from ½ to 6 inches; there is also a handy adjustment for making cracked ice. It produces approximately 5800 standard size cubes per day and the bin holds 200 lbs.

Mills Ice Cube Machine

Thermostat control regulates production of ice cubes to keep bins full at all times. Fresh running water is used, being fed directly to the ice making tubes from water supply system. No water storage tanks are required. Machine dimensions are: Height 66 in.; Depth 30 in.; Width 30 in.; Height to storage compartment, approximately 40 in.

New Series of Spray Fan Coolers

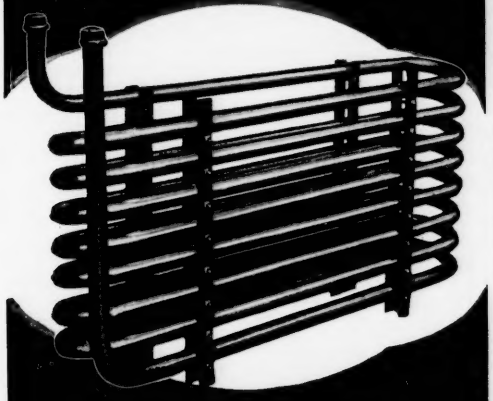
A NEW series of spray fan coolers for convenient installation in refrigerated rooms where high capacity is required by ceiling height is restricted, is announced by the Niagara Blower Co., New York City.

In the new "Low Head Room" design the fan section is located on the side of the unit instead of on its top as in conventional practice. The air enters the spray section at the top; it is chilled in passing down through the spray and over the refrigerant coils; it enters the fan section at the bottom and is discharged from the

Refrigeration

Coils

Smooth Bends
Perfect Welds
Exact Measurements



For over sixty years, the National Pipe Bending Coils have proved their quality in Ice and Refrigeration plants

NATIONAL PIPE

The Refrigeration

BRINE MEDIUM

that is

5 WAYS BETTER

SOLVAY

CALCIUM CHLORIDE

1 Provides a "long-life" brine . . . *lowest cost* in long run

2 Allows safe operation at *low temperatures* . . . permits quicker freezing

3 Makes your equipment last longer

4 Easier operation . . . requires less pumping

5 Reduces possibility of costly shut-downs and repairs

SOLVAY SALES DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

side at the top. When refrigerant temperatures below freezing are used, the process is kept free from frost, ice, or from freezing by the use of brine or Niagara "No Frost" liquid in the sprays.

The application is to food freezing and storage, meat packing, ice cream hardening, candy chilling, cooling and freezing tunnels and other refrigerating processes. Five unit sizes are produced at present, with capacities ranging from 1680 to 11,000 cfm. of chilled air. The maximum height is 72-inches. Floor space required ranges from 16 to 72 sq. ft. Because of improved efficiency in air travel, experience shows that this new type cooler delivers more air at lower power consumption than do conventional vertically arranged coolers. Patents have been applied for.

Ice Upending Machine

A COMPACT, portable ice upender is being manufactured by the Calumet Machine and Welding Works, 8630 Kennedy Ave., Highland, Indiana. This electric driven, hydraulic operated machine is equipped with rollers and handles so that it can easily be moved about the plant but it has the power to up end 400 lb. blocks of ice. As the block reaches the end of the slide it automatically starts the machine and the ice is lifted and discharged on end.

New portable ice upender made by Calumet Machine & Welding Works.

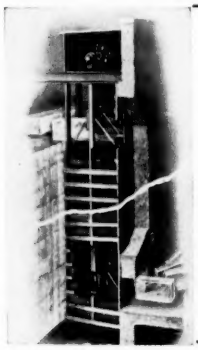
Information about this upending machine may be obtained from the manufacturer or from the Ice Plant Equipment Co., 2543 Frankford Ave., Philadelphia 25, Pa. The latter is a distributor for the machine in a number of sections of the country.

New Ice Platform Escalator

A NEW ice platform escalator designed for icing refrigerated transport trucks has been made by the Edwards Products Co., Macon, Ga. With this escalator it is claimed that the truck can be iced in much less time than required when ordinary methods are used. It is designed specifically to handle 25 lb. blocks, the size generally used, in icing transport trucks. Because it is balanced for ease of movement on the platform, it

New Ice Platform Escalator

can be handled by one man. Of all steel welded construction, it is bolted together for ease in assembling or disassembling. It is powered with a one



CEMCO

Double Gig Ice Hoist
Fast - Sturdy -
Dependable -

Send for details

THE CAPITAL
ELEVATOR & MFG. CO.
424 W. Town St.
Columbus 8, Ohio

A Book Written for the Engineer

The author, a man well versed in the construction and operation of ice making and refrigerating systems, has intended this work as a practical help to the engineer in his every day problems.

PRACTICAL REFRIGERATING ENGINEERS' POCKETBOOK

By John E. Starr

eliminates algebraic terms and tells the engineer in a simple manner how to determine if his plant is operating at the highest efficiency.

Cloth Binding. $2.50

NICKERSON & COLLINS CO.
435 N. Waller Ave., Chicago

There's NO DOUBT ABOUT IT- - - - -

For 15 years we have been satisfying more and more customers. Whether you want a complete air agitation system or only a handful of nozzles, get in touch with us.

Prompt Service — High Quality Merchandise — Fair Prices.
Write or Wire us to submit prices on your requirements.

Ice Vending Machines
Ice Crushers
Ice Upenders

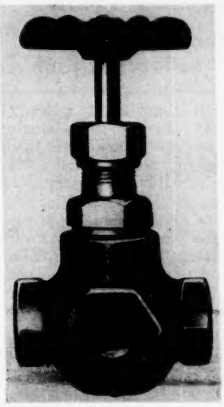
ICE PLANT EQUIPMENT CO., Inc.
2543 Frankford Avenue
Philadelphia 25, Pa.

Air Equipment
Can Fillers
Ice Tools

half horsepower gear head motor. The trough part may be packed at any desired height.

New Three-way Shut-off Valve

THE addition of a 3-way dual shut off valve to its line of refrigeration valves is announced by Cyrus Shank Co., Chicago, Ill. This valve is recommended for use where



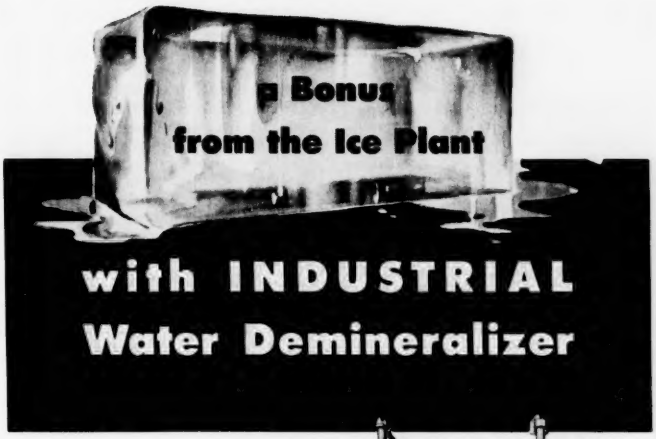
The new shank three-way shut-off valve.

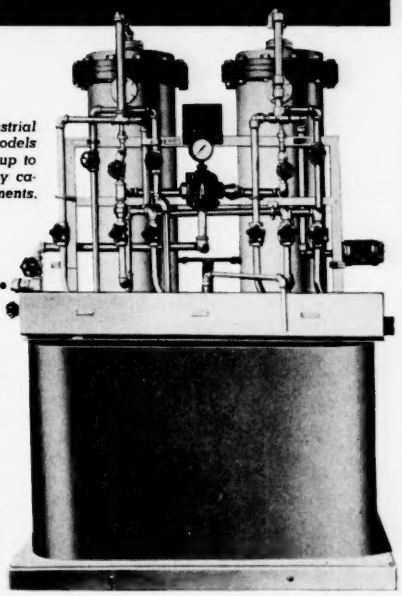
refrigeration codes require dual relief valve installations. It has a stainless steel stem and an indicator plate on hand wheel shows position of valve shut-off. The body is semi-steel, rust-proofed. Packing ring is composition, impregnated with graphite for ease of operation and long life. Further details may be had by addressing the manufacturer.

New Sealing Compound In Handy Stick Form

A NEW thread sealing compound is now being made by Armite Laboratories, Los Angeles, Calif. Designed to be carried in either pocket or tool kit, the manufacturer claims that the application of this stick to any pipe threads before joints are made up provides a positive seal

Showing display package and method of using Thread-Tite.





A typical two-bed Industrial Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

Here's how it works...

Instead of running ordinary city water into the freezing tanks, it is passed through the Industrial demineralizer where beds of ion-exchange resins remove the dissolved mineral salts—delivering the chemical equivalent of pure water.

With this pure water there are no minerals to deposit in the core—so the whole core-pulling operation is eliminated. Furthermore, the amount of ice which cracks in the cans is appreciably reduced. And the transparency of the whole cake is improved—your customers will notice the difference and like it.

It's easy to find out how to get this big bonus from your ice plant. Send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour). We will send you complete information on demineralized water, estimate of costs, performance data, etc. Better look into it right away.

FILTERS Pressure Type PUMPS Centrifugal CORROSION TESTING APPARATUS Salt Fog • Humidity

INDUSTRIAL FILTER & PUMP MFG. CO.

1635 West Carroll Avenue
Chicago 12, Illinois

RUBBER DIVISION
Vulcanized Linings • Molded Products

WATER DEMINERALIZERS

against gases, brine, acids, water, steam and ammonia at high and low pressures and temperatures. This compound, called "Thread-Tite," may be applied to steel, aluminum, iron, brass, plastic, copper, and threads in any other type of material.

In addition to providing a positive seal, it protects threads from seizing or galling. Pipe joints, bolts and studs can be drawn tighter than is normally possible, due to lubricating qualities in this compound, and then easily unscrewed, even after years of service.

According to the manufacturer, Thread-Tite will not harden or dry out in time, and is not affected by vibration. As the compound is used, the stick may be pushed forward in its case, allowing efficient application until material is completely used. Each stick is supplied with metal cap to prevent compound from getting dirty or rubbing off on clothing. This product it is expected, will find wide application in industry and at home. More information and a sample may be obtained by writing the manufacturer — Armite Laboratories, 6609 Broad Street, Los Angeles 1, Calif.

Trouble Free Service and INCREASED CAPACITY after installing J. H. H. VOSS VALVES

REG. U.S. PAT. OFF.

DESIGNED BY ENGINEERS
MADE BY CRAFTSMEN

in their COMPRESSORS

Replace those inefficient, troublesome valves and you too will get the utmost in economy, efficiency and safety of operation...you will get better results at lower power costs . . . you will get increased capacity . . . with VOSS VALVES.

This letter tells why

The WHITE BELT Dairy
Miami, Florida September 6, 1947

J. H. H. Voss Co., Inc.

In 1934 Voss Valves were installed in our 10 x 10 York ammonia compressor. This installation proved so satisfactory that we have installed Voss Valves in three other machines. To be specific in another 10 x 10, a 9 x 9 and a 7½ x 7½.

We wish to express our appreciation for the trouble free service and increased production that the installation of your valves have brought about.

As we add more machines to our refrigeration equipment they will be equipped with your valves.

WHITE BELT DAIRY,
John G. DuPuis, Jr., Manager

We will be glad to submit estimates if you will send us the name, bore, stroke and speed of your air, gas or ammonia compressors of any type or size.

J. H. H. VOSS CO., Inc. 785 East 144th Street NEW YORK 54, N. Y.

Leak Detector

A MASS spectrometer leak detector is described in a new four-page bulletin issued by Vacuum-Electronic Engineering Co., Brooklyn, N. Y. This detector, it is explained, is useful wherever a vacuum, fixed pressure or special atmosphere must be maintained for extended periods of time. The bulletin describes typical applications and principle of operation, with explanatory illustrations.

Pipe Installation in New Ice Hockey Rink

MORE than eight miles (43,000 feet) of 1¼-in. wrought iron pipe, laid on 4½-in. centers have been installed in the floor of a new ice hockey rink for Rensselaer Polytechnic Institute, Troy, N. Y. The pipe has since been imbedded in concrete, making a floor of more than 16,000 square feet in area. Rensselaer is reviving ice hockey this season and hopes to match its LaCrosse championship record of the past two years.

New ice hockey rink at Troy, N. Y. showing Byers pipe installation.

The record of wrought iron pipe in this highly corrosive service is impressive. It indicates that at least 20 years service can be expected before replacement whereas 11 years is the average for rinks where wrought iron was not specified. A Pittsburgh ice skating and hockey rink has operated 50 years with a large portion of the original wrought iron pipe.

MANUFACTURERS' NEWS

New Sales Agent For Moto-Trucs

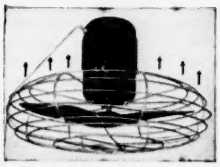
THE Midwest Industrial Truck and Supply Co., 2405 West 51st Street, Chicago, Illinois, has taken over the sales of Moto-Trucs in Illinois. The company is headed by

PITTSBURGH
a air p pressure t tested COILS

Welded Headers—Welded Ammonia Receivers—Accumulators
Pipe Coils—Bends—Boiler Tubes

Pittsburgh Pipe Coil & Bending Company
61 BRIDGE STREET, ETNA, PITTSBURGH 25, PA.

Reco REFRIGERATOR FAN
BLOWS UPWARD



Prevents Flavor Transference.
Keeps Walls and Ceilings Dry.
Dissipates Odors.

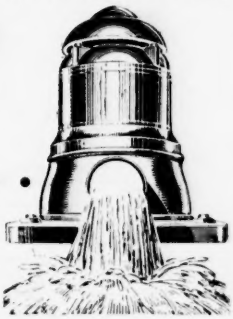
Keeps Coils Free from Frost and Ice.

Reduces Refrigerating Costs.

REYNOLDS ELECTRIC COMPANY
Established 1900
3060 RIVER ROAD RIVER GROVE, ILL.
*Reg. U. S. Pat. Off.

FREE
Write for Manual No. 241 giving valuable suggestions for product storage.

LOWER COST OPERATION
Longer Life



Layne well water systems are designed and built to produce much greater volumes of water than can be obtained from the conventional type of installation. Skillful designing and precision manufacture of the Layne Vertical Turbine pump used in these systems give extra high efficiency. The results are: more water—less cost and longer life for the unit. Furthermore, Layne well water systems are so ruggedly built that upkeep cost is almost nothing.

Thousands are now serving cities and industries throughout the world.

For further information on Layne Well Water Systems—or Layne Vertical Turbine Pumps, catalogs, etc., address

LAYNE & BOWLER, INC.
General Offices
Memphis 8, Tenn.

LAYNE
WELL WATER SYSTEMS

Actual Size
3½ in. square

Price $1.00

HEAD BACK PRESSURE CALCULATOR

The Head-Back Pressure Calculator quickly determines the proper head pressure, for various refrigerants when the suction pressure, room temperature or mean water temperature is known.

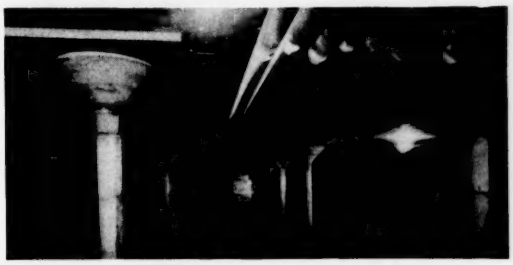
A number of troubles can be detected by comparison of the existing head pressure with what the head pressure should be, but in the past there has been no convenient method available to the engineer to determine what this should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all enter in determining the proper head pressure.

NICKERSON & COLLINS CO.
433 N. Waller Ave., CHICAGO 44, ILL.

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ *Saves Space*
★ *Saves Weight*
★ *Saves Cost*

CAN BE USED WITH ANY REFRIGERANT
SALES AGENCIES SOLICITED
Manufactured by
DETROIT ICE MACHINE COMPANY
2615 Twelfth St., Detroit 16, Mich.



Freezer Storage—70 Ft. x 90 Ft. x 11 Ft. High
The Terminal Cold Storage & Ice Co., Dayton, Ohio

W. Buryl Dalton Sr. who has been with the Kraft Foods Company for the past 10 years as materials handling engineer, Ronald A. Jones who has had 10 years experience in the industrial truck field and Bruce Dalton who has had factory training at the Moto-Truc Co. in Cleveland and who has been selling Moto-Truc equipment for the past year.

York Appointments

THE appointment of William R. H. Eby, a native of Oakland, Calif., to a newly created position of industrial sales manager of the Pacific District with headquarters in Los Angeles, has been announced by York Corp. Until recently Mr. Eby had been serving York as branch manager at Seattle. He has been with the firm ever since 1930, following his graduation from the University of Arizona, with a B.S. degree in Mechanical Engineering.

C. Mason Gerhart, who has been assistant to the commercial sales manager of York at Houston, Tex., has been transferred to the home office at York, Pa., as a sales engineer. A native of Roseville, Calif., Mr. Gerhart is a graduate of the University of Arizona, class of 1946 with a degree in Mechanical Engineering.

CATALOGS AND BULLETINS

New Bulletin on Controlled Humidity

2-PAGE bulletin has been issued by the Niagara Blower Co. describing its controlled humidity method of air conditioning. The use of this method, it is claimed, prevents condensation of moisture on metals or machines or other products. It also provides constant control of air temperature and humidity in both summer and winter. The bulletin is illustrated, one of the illustrations showing a flow diagram. A copy may be obtained by writing The Niagara Blower Co., 405 Lexington Ave., New York 17, N. Y.

New Bulletin on Ice Equipment

A NEW bulletin has been issued by the Frick Co., Waynesboro, Pa., listing some of the refrigerating, ice making and air conditioning equipment service available. The eight page bulletin is profusely illustrated with this particular refrigerating equipment, many of which are made from photographs of actual installations. The bulletin also contains a long list of typical Frick equipment. A copy of this bulletin is available to all who are interested.

Air Conditioning Units Catalog

A NEW 12-page catalog covering their complete line of air conditioning units has been prepared by Marlo Coil Company of St. Louis, manufacturers of heat transfer equipment. Designed for quick reference and use, the new catalog contains clear, detailed illustrations of the units with factual, simplified descriptions of design basis and operation. Easy-to-use dimensional data, capacities and ratings serve to make the catalog a complete and practical working and estimating guide for air conditioning installation, service and maintenance engineers.

Copies may be obtained by writing to the Marlo Coil Company, 6135 Manchester Avenue, St. Louis 10, Mo. Ask for Bulletin #409.

New Bulletin on Refrigeration Losses

A NEW bulletin which deals with losses in the refrigeration system and methods of correction has been made available to management and refrigeration engineers by Rex Engineering and Sales Co. Interesting and helpful information on the effects of non-condensable gases, water and oil in the system, reduced heat transfer and efficient operating pressures and temperatures is given. A copy may be had by writing to Rex Engineering Fiberglas Corp., Toledo 1, Ohio.

Bulletin on Water Tube Boiler

A NEW bulletin has been issued by The Henry Vogt Machine Co., Louisville, Ky., covering the company's Class VL water tube boiler. The bulletin of 16 pages and cover describes the basic design and advantages of this equipment. Diagrams and specifications of a number of installations, also photographs illustrating processes in the making of these boilers are shown. Copies will be sent to interested parties upon request to the Vogt Company.

MARTOCELLO ICE PICKS

"Cost You Less To Buy The Best"

Immediate Delivery on Plain Handle Ice Picks

BLADES

of High Carbon Tool Steel, accurately tempered to give you maximum use.

HANDLES

of Sound, Clear Hard Wood with Protective Flexible Lacquer Coating.

FERRULES

of Pressed Steel securely registered on Handle and Plated to Resist Corrosion.

PRICES ON PLAIN AND PRINTED HANDLES HAVE BEEN REDUCED! WRITE TODAY FOR NEW PRICES.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916" — *"There is no Substitute for* MARTOCELLO QUALITY"

ACTIVE CARBON

Produced in the West
Especially for

COLD STORAGE AIR FILTRATION
AIR CONDITIONING and
PURIFICATION

and use in

WATER PURIFIERS

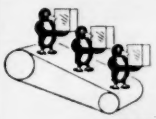
in which hard granular activated carbon is required.

Technical data, samples, and prices gladly furnished on request.

R. T. COLLIER CORPORATION

HEAD OFFICE
714 West Olympic Boulevard
Los Angeles 15, California
PLANT: P.O. Box 359
Santa Clara, California

INDUSTRIAL CARBONS & CHEMICALS



Penguin ICE SERVICE

Model VS-81F
Vending Station

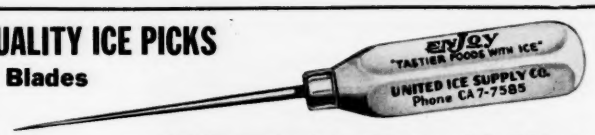
PENGUIN AUTOMATIC
ICE VENDING STATIONS

are engineered for economical operation in the hottest climates. Rigid board-form insulation, 1½ H.P. compressor, double gasketed doors, and double doored delivery chutes combine to seal out hot air. Ventilated, peaked roof repels sun's rays.

Write for Descriptive Literature and Prices

TOWAL MANUFACTURING CO., INC.
MT. VERNON ILLINOIS, U.S.A.

"BEN SPECIAL"—QUALITY ICE PICKS
Plain—Printed—Replacement Blades
Nationally known for the best
UNITED ICE & OIL SUPPLY CO.



55 Beverly St., Boston 14, Mass.

VAN RENSSELAER H. GREENE
ENGINEERS
COMPLETE PLANT DESIGNS INCLUDING
BUILDING AND EQUIPMENT
11 PARK PLACE **NEW YORK 7, N.Y.**

FRED OPHULS & ASSOCIATES,
Consulting Engineers
112-114 WEST 42nd ST. NEW YORK CITY 18
Ice Making and Refrigeration - Industrial Power Plants
Reports, Appraisals and Management

THE INDEX LINE
ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1949 catalog.

INDEX COUPON AND SUPPLY COMPANY
LA PORTE, INDIANA

VIVIAN SERV-ICE
TRADE MARK REG. U.S. PAT. OFF.
Products
ICE TOOLS AND SUPPLIES

WE CONTINUE YEAR AFTER YEAR
to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.

PRICE UPON REQUEST

VIVIAN MANUFACTURING CO. 4132-38 Folsom Ave., St. Louis 10, Mo.

BOWER
-B B Brand AMMONIA

Est. 1858

Immediate shipment and purity of product are two good reasons for specifying Bower Brand. Please keep empty cylinder rotating.

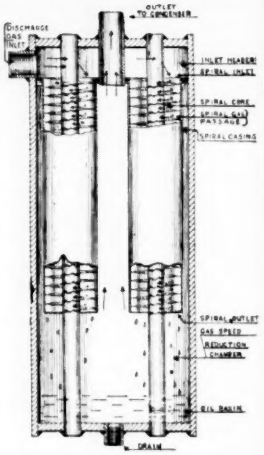
HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29th & GRAY'S FERRY ROAD
PHILADELPHIA, PA.

"King Zeero"
OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE

Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.



Built for years of trouble free service. Mechanical details on request.

THE KING ZEERO COMPANY
1447-55 Montrose Ave., Chicago 13, Ill.

THE BUYERS

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

ABSORBERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ACTIVATED CARBON EQUIPMENT
Collier Corp, R. T., Los Angeles, Calif.

AIR AGITATING SYSTEMS AND FITTINGS
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

AIR CIRCULATORS
Reynolds Electric Co., River Grove, Ill.

AIR COMPRESSORS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Refrigeration Engineering, Inc., Los Angeles, Calif.

AIR PURIFYING EQUIPMENT
Collier Corp., R. T., Los Angeles. Calif.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.
Voss, Inc., J. H. H., New York, N. Y.

AMMONIA COMPRESSORS
Baker Refrigeration Corp. So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.

AMMONIA FLOAT VALVES
Acme Industries, Inc., Jackson, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Voss, Inc., J. H. H., New York, N. Y.
York Corp., York, Pa.

AMMONIA GAUGES—INDICATING AND RECORDING
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

AMMONIA MANUFACTURERS
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.
Mathieson Chemical Corp., Baltimore, Md.
National Ammonia Div., DuPont, Wilmington, Del.

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

AMMONIA VALVES & FITTINGS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co. Oklahoma City, Okla.
Reynolds Electric Co., River Grove, Ill.
York Corp., York, Pa.

BAGS, ICE
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

BAGS, WATERPROOF PAPER
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Co. New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

BUYERS DIRECTORY CONTINUED—NEXT PAGE

DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

BRINE TREATMENT
Chemical Solvent Co., Birmingham, Ala.
Wright Chemical Corp., Chicago, Ill.

CALCIUM CHLORIDE
Salvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.

CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

CAR ICING EQUIPMENT
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.

COAL HANDLING MACHINERY
Gifford-Wood Co., Hudson, N. Y.

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co. Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburg Pipe Coil & Bending Co., Pittsburg, Pa.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.
Mundet Cork Corp., Brooklyn, N. Y.
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE DOORS
Butcher Boy Cold Storage Door Co., Chicago, Ill.
Jamison Cold Stge. Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Minneapolis, Minn.

COMPRESSORS
(See Ice Making and refrigerating Machinery)
(See Air Compressors)

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Baker Refrigeration Corp. So. Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc. R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CONSULTING ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

COOLING TOWERS
Binks Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.
Mundet Cork Corp., Brooklyn, N.Y.

COUPON BOOKS
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

COVERINGS (PIPE AND BOILERS)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Mundet Cork Corp., Brooklyn, N.Y.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

DEIONIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DEMINERALIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DIESEL ENGINES
Caterpillar Tractor Co., Peoria, Ill.

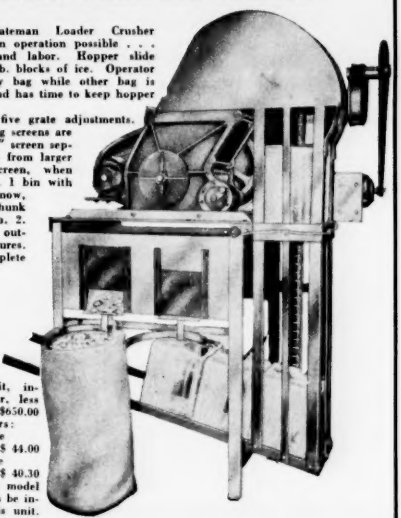
DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BUYERS DIRECTORY CONTINUED—NEXT PAGE

AUTOMATIC LOADER CRUSHER Saves TIME and LABOR!

Automatic Bateman Loader Crusher makes one-man operation possible . . . saving time and labor. Hopper slide holds five 50-lb. blocks of ice. Operator replaces empty bag while other bag is being filled, and has time to keep hopper loaded.

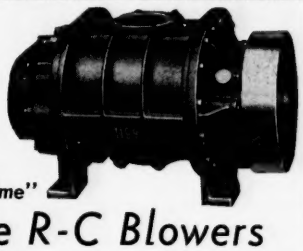
Crusher has five grate adjustments. Two new sizing screens are furnished. 5/8" screen separates fine ice from larger size. 3/4" screen, when used, fills No. 1 bin with pea-size and snow, leaving clean chunk ice in Bin No. 2. Many other outstanding features. Write for complete information.



Complete unit, including bagger, less motor $650.00
Crusher Motors:
3/4 H.P. Single Phase ..... $ 44.00
3/4 H.P. Three Phase ..... $ 40.30
Any Bateman model 50 crusher can be installed on this unit.

All Inquiries Answered Promptly

BATEMAN FOUNDRY & MACHINE CO., INC.
MINERAL WELLS, TEXAS



For a "good ole summertime"

use R-C Blowers

Get set now with R-C Rotary Positive Blowers for spring and summer ice plant demands. Be sure needless down time or lack of capacity doesn't catch you short. R-C Blowers assure delivery of the exact volume of air at pressures to meet your needs.

Years and years of continuous service at rated capacity are built into R-C Blowers. Simple design and no small moving parts assure high performance and low maintenance. Write us your requirements or ask for Bulletin R-C 1247.

ROOTS-CONNERSVILLE BLOWER Corp.
502 Columbia Avenue • Connersville, Indiana

ROOTS-CONNERSVILLE BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

WOLF-LINDE

Est. 1880

"THE OLDEST NAME IN REFRIGERATION"

Our 1950 Catalogue of Ammonia Valves and Fittings Is Now Available. This 15th Edition Will Be a Valuable Adjunct to Your Engineering Library. Requests for Copies Will Receive Our Immediate Attention.

Manufactured and Sold by

DERSCH, GESSWEIN & NEUERT, Inc.

4849 West Grand Avenue — Chicago 39, Illinois

PRINCIPLES of REFRIGERATION

The Book for:

- ERECTING ENGINEERS
- OPERATING ENGINEERS
- CONSULTING ENGINEERS
- SALES ENGINEERS
- CONTRACTORS
- ARCHITECTS
- STUDENTS
- PLANT OWNERS

PRINCIPLES OF REFRIGERATION, 3rd Edition (1947) revised by Wm. H. Motz, provides information and data for the practicing refrigeration engineer. Of special interest to erecting and operating refrigerating engineers, refrigeration machinery sales engineers, persons employed in building refrigerating machinery and those employed in ice making, cold storage plants or other establishments equipped with refrigerating machinery. Contains information that the refrigerating engineer should know in order that he may have complete and up-to-date knowledge.

Written in every day language and as free as possible from higher mathematics. The theoretical and fundamental operating principles are given attention first—followed by numerous practical considerations and the application of principles to the economic production of ice and refrigeration for various purposes.

672 Pages—215 Illustrations—9 Folded in charts—6 Working charts in Cover Pocket. Substantially bound. **$8.00**

NICKERSON & COLLINS CO.

433 N. Waller Ave. — Chicago 44, Illinois

THE BUYERS

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa.
Link-Belt Co., Chicago, Ill.

ELEVATING & CONVEYING MACHINERY
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

ENGINES
Caterpillar Tractor Co., Peoria, Ill.
Frick Co., Waynesboro, Pa.

EVAPORATIVE CONDENSERS
Refrigeration Engineering, Inc., Los Angeles, Calif.

EVAPORATORS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

FEED-WATER HEATERS
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa.

FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply, Boston, Mass.

FILTERS, CLARIFYING
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

FILTERS, WATER
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
York Corp., York, Pa.

FILTERS, WATER—INDUSTRIAL
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

FILTRATION EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

FIN COILS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.
York Corp., York, Pa.

FIRST AID SUPPLIES
Acme Protection Equipment Co., Chicago, Ill.

FITTINGS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Henry Valve Co., Chicago, Ill.

FOOD FREEZING EQUIPMENT
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.
Rempe Company, Chicago, Ill.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.

GAS AND OIL ENGINES
Caterpillar Tractor Co., Peoria, Ill.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Capital Elevator & Mfg. Co., Columbus, Ohio
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.

ICE BAGS
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

ICE CANS
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CHIPPERS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Co., Minneapolis, Minn.
Refrigeration Engineering Corp., Philadelphia, Pa.
United Ice & Oil Supply, Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Jamison Cold Storage Door Co., Hagerstown, Md.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

ICE CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Refrigeration Engineering Co., Minneapolis, Minn.
United Ice & Oil Supply, Boston, Mass.

ICE CREAM PLANTS
Baker Refrigeration Corp. So. Windham, Maine
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BUYERS DIRECTORY CONTINUED—NEXT PAGE

DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
The Lilly Co., Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBE CONTAINERS
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
Union Bag & Paper Co., New York, N. Y.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBERS
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Thermo Cuber Co., Inc., Chicago, Ill.
United Ice & Oil Supply Co., Boston, Mass.

ICE DELIVERY BAGS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE ELEVATORS AND CONVEYORS
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

ICE MAKING AND REFRIGERATING MACHINERY
Baker Ice Machine Co., Inc., South Windham, Maine
Creamery Package Mfg. Co., Chicago, Il.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Enterprise Equipment Corp., Yonkers, N. Y.
Detroit Ice Machine Co., Detroit, Mich.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK VENDING MACHINES
Towal Mfg. Co. Inc., Mount Vernon, Ill.

ICE PLANTS
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp. Philadelphia, Pa.

ICE RECORDING MACHINERY
Jamison Cold Storage Door Co., Hagerstown, Md.

ICE SCALES
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE TONGS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

ICE TOOLS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE VENDORS
Dickinson & Co., F. B. Des Moines, Ia.
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co. Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Inc., Chicago, Ill.
Towal Mfg. Co. Inc., Mount Vernon, Ill.
United Ice & Oil Supply Co., Boston, Mass.

ICED DISPLAY CASES
(See Display Cases)

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Mundet Cork Corp., Brooklyn, N. Y.
Pacific Lumber Co., San Francisco, Calif.

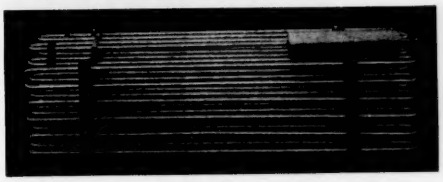
LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

BUYERS DIRECTORY CONTINUED— NEXT PAGE

QUALITY COILS FOR ALL APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.

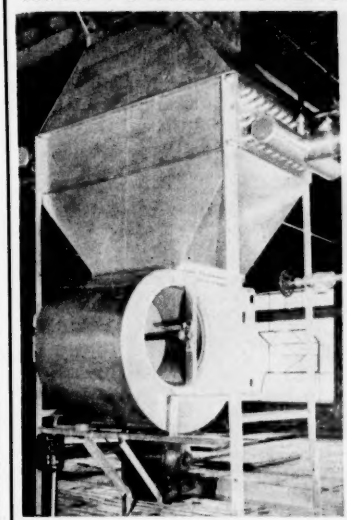


Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

SEND DRAWING OR BLUE PRINT FOR QUOTATION

CHICAGO NIPPLE MFG. CO.
1997 Clybourn Ave., Chicago 14, Ill.

7-TON INCREASE IN TONNAGE— WITH POWER DECREASE OF 27%



It's Done Every Day with a **REX SUPER HEAT EXTRACTOR**

Here is what one user says—

"Before installing the Rex Super Heat Extractor we were operating at 18 pound suction and 205 pound discharge pressures. After installing the Heat Extractor we were able to operate at 23 pound suction and 165 pound discharge pressure, which increased our ice making by SEVEN TONS, with a decreased condensing temperature of 20%."

Results like these are not rare, but are being achieved daily with Rex Super Heat Extractors.

Write today for NEW Bulletin "Cold Facts" — every engineer and manager should have one.

REX ENGINEERING & SALES CO
Oklahoma City, Oklahoma
BOX 5141

WEATHERPROOFED ICE SIGNAL CARDS

Coated Both Sides With Paraffine

ANY COLOR

ANY SIZE

We Make Any Design of Ice Signal Card

Send In Your Individually Designed Cards for Quotation

Write for Ice Signal Card Circular and Prices

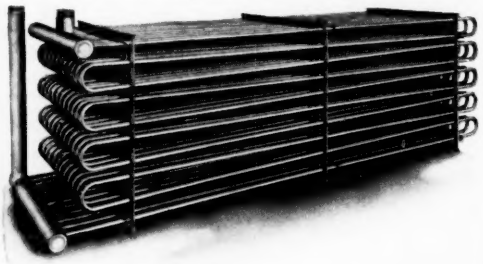
Index Coupon & Supply Co.

LaPorte, Indiana

REMPE PIPE COILS

MOST EFFICIENT!
for replacements
for new installations

WHY? It's the way we build them—the precision bending—the expert welding—the thorough testing under water with 350 lbs. air pressure—over 60 years experience in building coils for refrigeration.



This coil is typical of the many varieties of coils produced by us. Coils, bends or fabricated pipe—coil and tank assemblies are designed and built to your requirements. Send details for engineering assistance and quotation.

REMPE CO.

348 N. Sacramento Blvd., Chicago 12, Ill.

Pipe and Fin Coils for Refrigeration and Air Conditioning.

THE BUYERS

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

MASKS, AMMONIA
Acme Protection Equipment Co.

MATERIALS HANDLING EQUIPMENT
Ohio Galvanizing & Mfg. Co., Niles, Ohio
The Moto-Truc Co., Cleveland, Ohio

OIL AND LUBRICANTS
Frick Company, Waynesboro, Pa.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, CUTTING
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Company, Chicago, Ill.
Rex Engineering & Sales Co. Oklahoma City, Okla.

OILS, FUEL
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.
Vivian Mfg. Co., St. Louis, Mo.
York Corp., York, Pa.

PALLET TRUCKS (MOTORIZED)
The Moto-Truc Co., Cleveland, Ohio

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

PIPE COVERING
(See Coverings, Pipe and Boiler)

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Frick Company, Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PRESSURE BLOWERS
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PROPELLERS
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

PUMPING MACHINERY
Aurora Pump Co., Aurora, Ill.
Deming Co., The, Salem, O.
Layne & Bowler, Inc., Memphis, Tenn.

PUMPING MACHINERY, Contd.
Refrigeration Engineering Corp., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPING MACHINERY—AIR LIFT
Deming Co., The, Salem, O.
Martocello & Co., Jos. A., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS, AMMONIA AND BRINE
Baker Refrigeration Corp., So. Windham, Maine
Deming Co., The, Salem, O.
Frick Company, Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

PUMPS, DEEP WELL
Deming Co., The, Salem, O.
Layne & Bowler, Inc., Memphis, Tenn.

PUMPS, ROTARY
Aurora Pump Company, Aurora, Ill.
Deming Co., The, Salem, O.
Martocello & Co., Jos. A., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PURGERS
Armstrong Machine Works, Three Rivers, Mich.
Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co. Oklahoma City, Okla.
York Corp., York, Pa.

RAW WATER FREEZING SYSTEMS
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

REBOILERS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

REFRIGERATED ICE STATIONS
Dickinson & Co., F. B., Des Moines, Ia.
Refrigeration Engineering Co., Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Towal Mfg. Co. Inc., Mount Vernon, Ill.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

REFRIGERATOR FANS
Reynolds Electric Co., River Grove, Ill.

BUYERS DIRECTORY CONTINUED—NEXT PAGE

DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 88

RESPIRATORS
Acme Protection Equipment Co., Chicago, Ill.

RUST PREVENTIVES
Bower Chemical Co., Henry, Philadelphia, Pa.

SCORING MACHINES
Frick Company, Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Perfection Ice Scoring Machine Co., Fort Worth, Texas
United ce & Oil Supply Co., Boston, Mass.

SECOND HAND MACHINERY AND SUPPLIES
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
United ce & Oil Supply Co., Boston, Mass.

SEPARATORS OIL, STEAM AND AMMONIA
Acme Industries, Inc., Jackson, Mich.
Frick Company, Waynesboro, Pa.
King-Zeero Company, Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
The Lilly Co., Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SPRAY COOLING SYSTEMS
Binks Mfg. Co., Chicago, Ill.

SPRAY NOZZLES
Binks Mfg. Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

SPRAY PONDS
Binks Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
York Corp., York, Pa.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

STRAINERS
Martocello & Co., Jos. A., Philadelphia, Pa.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
York Corp., York, Pa.

TARPAULINS
Index Coupon & Supply Co., La Porte, Ind.
The Lilly Co., Memphis, Tenn.
United ce & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

THERMOMETERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.

TIERING MACHINES
Capital Elevator & Mfg. Co.,
Gifford-Wood Co., Hudson, N. Y.

TRAPS, OIL & STEAM
Armstrong Machine Works, Three Rivers, Mich.

TRUCK BODIES
Gifford-Wood Co., Hudson, N. Y.

TRUCKS, MOTORIZED LIFT
The Moto-Truc Co., Cleveland, Ohio

UNIT COOLERS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Refrigeration Engineering, Inc., Los Angeles, Calif.

USED MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

VALVES AND FITTINGS
Alco Valve Co., St. Louis, Mo.
Frick Company, Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Phillips & Co., H. A., Chicago, Ill.
Refrigeration Engineering Corp., Philadelphia, Pa.
Rempe Co., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Voss, Inc., J. H. H., New York, N.Y.
York Corp., York, Pa.

WATER COOLERS
Acme Industries, Inc., Jackson, Mich.

WATER SUPPLY CONTRACTORS
Layne & Bowler, Inc., Memphis, Tenn.

WATER TREATMENT MATERIALS
Chemical Solvent Co., Birmingham, Ala.
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.
Mathieson Chemical Corp., Baltimore, Md.

WELDING
Frick Company, Waynesboro, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

WELL SCREENS
Layne & Bowler, Inc., Memphis, Tenn.

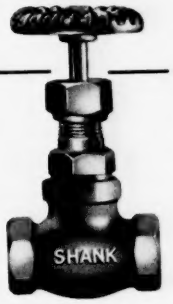
WROUGHT IRON PIPE
Byers Co., A. M., Pittsburgh, Pa.

SHANK
REFRIGERATION PRODUCTS

Recognized as The Symbol of Quality

3-WAY DUAL SHUT-OFF VALVE

For use where Refrigeration Codes require dual relief valve installations. Stainless steel stem. Indicator plate on hand wheel shows position of valve shut off. Completely rust-proofed.



SEMI-STEEL SHUT-OFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem—Shank design base—perfect alignment. Long life packing ring.

If your jobber doesn't stock—write

CYRUS SHANK CO.
629 W. Jackson Blvd. Chicago 6, Ill.

Philadelphia Pipe Coils
ESTABLISHED 1880
Continuous Welded Pipe Coils of Any Metal, Size or Design
PHILADELPHIA PIPE BENDING CO.
FIFTH STREET & N. P. R. R.
PHILADELPHIA

WANTED and FOR SALE ADVERTISEMENTS

Rates: $3.50 for 50 words or less; 60c for each additional 10 words or fraction thereof; 75c per line for bold face headings; $9.00 per inch for ads all set in bold face type or listing items on separate lines.

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for the purchase and sale of USED equipment, existing and used plants, and surplus material.

POSITIONS AND HELP WANTED

WANTED—Successful ice pick representative or jobber desiring exclusive territory with leading ice pick manufacturer. Recommend immediate reply; openings made possible through new sales program. Write Apex Products, 48 West 22nd St., New York City 10, N. Y.

Experienced Refrigeration Equipment Salesman

To handle non-competitive line of National Manufacturer specializing in prefabricated, sectional Walk-In Freeze Coolers, Ice Making Equipment, Ice Cream Novelty Manufacturing Equipment, Ice Cream Vending Carts, etc. Liberal commissions, protected territories, requiring aggressive man with car. Lucrative field, contacting National Accounts, Ice Cream Manufacturers, Frozen Foods Distributors and Packers, Wholesalers, Retailers, etc. Sell direct or through distributor or service companies. Strong back-up by trade journal and direct mail advertising. Right man brought to factory for orientation and helped by experienced field man for short time on road. Strictly on commission basis. Give full details first letter. Several very good territories available. Box No. FB-2, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

ICE PLANTS—*Wanted and For Sale*

FOR SALE/OR WANTED—Experienced managing partner—15 ton ice plant with complete 350 locker plant. Capacity business and always will be. Ahrens Ice Co., Mountain Home, Arkansas.

FOR LEASE—Ice plant and coal business in good industrial city of 25,000 population in northeastern Ohio. Attractive proposition. The right man can get into business for himself with very little money. Plant can be taken over in April 1950. Inquire George P. Samman, 1509 Williamson Bldg., Cleveland 14, Ohio.

FOR SALE—Modern ice plant, 20 tons capacity. Located in deep South; good climate, large territory; good future. Could stand enlarging to double its size. About 4 years old. Must sell on account of sickness. No reasonable offer refused. Cash or terms. An opportunity of a lifetime to a person sincerely interested in purchasing an ice plant. Address Box NV-16 Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

USED MACHINERY—*Wanted and For Sale*

WANTED—In the market for any good used refrigerating and ice making equipment you may have for sale. Address Box DC-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—One 6¾"x5" V/W York ammonia booster compressor 8 cylinder V-belt drive complete with base, including 440 volt A.C. motor and 36"x12' long D.E. gas and liquor cooler plus valves. This equipment is new and has never been installed. If interested contact W. A. Moore, General Manager, New Orleans Cold Storage & Warehouse Co. Ltd., 305 Gaiennie St., New Orleans, La.

FOR SALE—York compressors, 4x4, 5x5, 6x6, 6½x6½, 7½x7½, 8x8 and 9x9, splash lubrication. Also 3x3 and 4x4 self-contained Yorks. One 20 ton, one 40 ton Vogt horizontal shell and tube condensers. Two 10 h.p. Frick Freon condensing units. One 2 h.p. vertical agitator. E. Niebling, 1318 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE

204—Ice cans 11x22x50, excellent condition, made up in groups of three—easily taken apart, $5.00 each.
210—Ice cans, 11½x22½x45, used one season, 14 ga. sides, 12 ga. bottoms, $7.00 each.
1—5 h.p. blower less pulley—$200.00.
1—3 h.p. blower—$150.00
2—2 h.p. agitators—$125.00 each
1—3 h.p. agitator—$150.00
1—Uline scoring machine—Good condition $100.00. 306 can ice tank 20'x40'; cooler, float valve, accumulator, agitator, lids, 3-can lift. 204—11x22x50 cans. Make offer as unit or will sell any part.

THE HOME CITY ICE CO.
Cincinnati 33, Ohio

USED MACHINERY—*Wanted and For Sale—Cont.*

FOR SALE—Arctic ice machine 8"x8", together with 30 h.p. motor with comensator starter; can be seen in running condition. Burke Ice Co., Newcastle, Indiana.

FOR SALE

1—5x5 2 cylinder Howe double acting open water jacket ammonia compressor, complete with 75 h.p., 3 phase, 720 r.p.m. General Electric slip ring motor; also large quantity of pumps, motors, switches. David Gordon, Inc., 1904 So. Michigan Ave., Chicago 16, Ill.

FOR SALE—1—6x6 York high speed ammonia compressor with 30 h.p. 3/60/220 volt motor, 16" dia. x 16' long condenser containing 42—1¼" tubes, receiver, oil trap, gauge board and connections. L. Earl, 70 Hillyer St., Orange, N. J.

FOR SALE—100 h.p. Y Fairbanks Morse Diesel engine, clutch lineshaft and pulleys, $500.00. 1—Y-15 9"x9" York compressor, 1—Y-15 7½"x7½" compressor, V-belts and new bearings, each $400.00. 1—25 h.p. and 1—30 h.p. motor 220/440/3/60; 4 stands double pipe York condensers; new 3/16" 18'x18'x4' freezing tank, never been used; 1 tank ¼"x30'x16'x4' with coils; 1 Martocello air systems, new tubes; 250 cans 11½"x22½"x44" at $1.00 each; 4,000 ft. 1¼" ammonia coils; miscellaneous ammonia valves, fittings, pumps, etc. Winfield Ice Plant, Winfield, Iowa.

FOR SALE

3—Shell & tube Vogt ammonia vertical condensers, size 42"x12' high, containing 203—2" tubs, with 1266 sq. ft. of surface area.
2—1200 GPM 40' head pumps direct coupled to General Electric motors.
2—190 h.p. 514 r.p.m., 3 phase, 60 cycle, 220 V synchronous motors, with belt pulley.
2—15 h.p., 3 phase, 220V., 84 r.p.m. output Westinghouse gearhead motors.
Large quantity of 1¼—2" pipe, miscellaneous valves, fittings, pumps and motors of all sizes.

DAVID GORDON, INC.
1904 S. Michigan Ave. Chicago 16, Ill.

FOR SALE

Complete used ice making systems, ammonia compressors, shell & tube and double pipe condensers, brine coolers, oil traps, receivers, ice cans, electric cranes, pumps, valves and fittings. Send us your requirements.

B & E REFRIGERATING CO.
2 Orange St., Newark, N. J. Phone Mitchell 3-7790-9

FOR SALE – ICE PLANTS & EQUIPMENT

Frick 1040 Can Tan 10-can grids complete low side. Excellent condition.
1—30 Ton York Ice plant electric driven, herringbone coils, late type.
1—10"x10" York two cylinder ammonia compressor
2—6"x6" two cylinder Voss high speed ammonia compressor
2—4"x4" two cylinder York high speed ammonia compressor.
1—3"x3" two cylinder Frick unit, high speed.
Shell and Tube vertical condenser—36"x14'—162 two inch tubes.
2—16" dia. x 10'-0" long 6-pass enclosed type ammonia condenser.
1—25" dia. x 10'-0" long 5-pass enclosed type ammonia condenser.
Assorted sizes electric hoists ranging from 2 to 6 ton capacity.
1—Gifford Wood Uline Scoring Machine Series No. 3.
2—Shell and tube submerged type brine coolers—36"x12'—143—2" tubes.
1—12½"x14½" York vertical ammonia compressor slow speed.
600—11"x22"x48" ice cans.
Brine coolers, double pipe 2" and 2" horizontal brine coolers, submerged shell and tube type, 1¾" and 2" ammonia coils approximately 10,000 feet. Send us your requirements on any equipment you may need.

ENTERPRISE EQUIPMENT CORPORATION
Phone: Yonkers 8-8118-9
77-79 Alexander St., Yonkers, N. Y.

A Vest Pocket Library

For the Engineer
REFRIGERATION MEMORANDA
(12th edition)
By JOHN LEVEY
A handy book containing a surprising amount of useful data required in everyday practice.
FLEXIBLE LEATHER—ONE DOLLAR
Nickerson & Collins Co., Publishers, 435 Waller Ave., Chicago

USED ICE MACHINES AND EQUIPMENT

All Used Equipment Is Reconditioned in Our Modern Machine Shop

THIS IS ONLY A PARTIAL LIST—WRITE ABOUT ANY REQUIREMENTS WHICH YOU HAVE WE ARE BUYING ADDITIONAL EQUIPMENT ALL OF THE TIME.

Compressors With or Without Motors

	Item No.
1—4x4 York, 300 RPM	16
6—6x6 York's, 200 RPM	20
1—6x6 Frick, 257 RPM	21
2—6½x6½ Arctics, 350 RPM, forced feed lub.	30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication	35
1—7x7 Frick, 200 RPM	40
1—7½x7½ York, 200 RPM	51
2—9x9 Arctic, 300 RPM, forced feed lub.	62
1—9x9 Frick 225 RPM direct connected to a 60 HP synchronous motor, forced feed lubrication	67
2—9x9 Late type Yorks, 400 RPM, forced feed lub.	69
1—9x9 Frick, 200 RPM	70
1—9x9 York, 200 RPM	71
1—9x9 Worthington, 325 RPM, forced feed lub.	72
1—10x10 De La Vergne, 360 RPM, forced feed lub.	73
1—10x10 York, 257 RPM, forced feed lub.	80
1—10x10 Carbondale, 100 HP synch. motor, 350 RPM	81
3—10x10 York's, 225 RPM, semi-forced feed lub.	82
1—12x12 Frick, Forced feed, 300 RPM	89
1—11x13 York, 164 RPM, forced feed lub.	90
1—17x18 Frick, direct conn. 300 HP synch. motor	91

Diesel Driven and Diesel Engines

1—8x8 York—Direct connected to 50 H.P. Fairbanks-Morse at 257 R.P.M.	210
1—175 H.P. Fairbanks-Morse Diesel engine	211
1—150 H.P. Van Severin—300 R.P.M.—Diesel engine	212

Steam Driven

1—7½x7½ Vertical York, 200 R.P.M. direct connected to steam engine	326
1—8x8 Vertical York, 300 R.P.M. direct connected	327

Complete Ice Plants

	Item No.
1—15-ton electric driven plant	630
1—600 Can Trunk Coil Type—York Plant, Brand New Tank. *Complete with 10 Can Grids. This plant is equal to new*	631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull	632
2—*247 Can, 22-ton ice plants, like new*	632A
1—35-38 ton New Clear Ice Making Plants	635

Self-Contained Units

3—4x4 York & Fricks	742
1—5x5 York—390 R.P.M.	743
1—4½x5 Lipman—360 R.P.M.	744
1—3x3 Worthington	748
1—5x5 Frick—Forced Feed—400 R.P.M. Latest Type	758

Brine Coolers

1—34x12—96—2—Retubed	801
1—34x10—100—2	802
1—48"x16'—130--2" tubes	808

Condensers

3—100 ton shell and tube condensers retubed	919
2—Stands—Vogt Multi-tube—Each stand 6 pipes high. Each pipe 9"x18" with 7—2" tubes	920
1—125-ton, Vertical Shell & Tube, 196 2" tubes	921
1—120 ton, 216—2" retubed Vertical Shell & Tube	922
2—20 ton Horizontal—retubed	924

Ice Cans

400—11½"x22½"x44"—cap refinished in zinc

Pipe

10,000 feet wrought Iron pipe—2"—like new	451

NEW EQUIPMENT FOR IMMEDIATE DELIVERY

Compressors With or Without Motors

	Item No.
3x3 to 5 x 5—390 R.P.M.	1001
6x6 to 10x10—390 R.P.M.	1002
3x3 to 5 x 5—Self-contained units, complete	1003
5x5—Self contained—15 H.P. motor—V Belt	1004

Ammonia Condensers

4—12¾x12 Horizontal—36—1¼" tubes	1020
2—30x14 Vertical 109—2" tubes	1021
1—16"x10"x10' Shell and Tube Condenser, 60 1¼" tubes	1022

Evaporative Condensers

Ice Cans

50—100 lb. cans—15½"x8"x31"	1041
40—50 lb. cans—6"x12"x26"	1042

Ammonia Valves and Fittings

⅜" to ¾"—Screwed Expansion Valves	1050
½" to 2"—Screwed Globe Valves	1051
1" to 6"—Square Flanged Globe Valves	1052
Check Valves	1053
Relief Valves	1054
Strainers	1055
Steel & Malleable Fittings	1056
Extra heavy Ammonia Nipples	1057

Ammonia Gauges

High and Low Pressure Type	1060

Ammonia Receivers

All Sizes.

Ice Crushers

Gas and Electric Driven	1070

Agitators

New 2 H.P. and 3 H.P. Vertical Agitators

Cold Storage Doors

Receivers and Oil Separators

All sizes	1080

Robert P. Kehoe Machinery Company, Inc.

6 EUCKER ST. & BERGEN TURNPIKE
RIDGEFIELD PARK, N. J.

PHONE: HAckensack 2-8554-5
CABLE ADDRESS: KEHOEINC.

That clean Mathieson Ammonia is quick on the take-off. A call from you to the nearest of Mathieson's 44 warehouses will bring "Super-Math" in a flash . . . and we do mean "super". It's pure—really pure—purged of moisture, non-condensable gases and other undesirables. Every cylinder and valve is thoroughly checked before quick-shipment to you. So if you need pure ammonia promptly, call Mathieson. Swift deliveries in 100- and 150-lb. cylinders.

MATHIESON CHEMICAL CORP.
Mathieson Building Baltimore 3, Maryland

Mathieson
AMMONIA

Ammonia, Anhydrous & Aqua...Caustic Soda
Soda Ash ..Bicarbonate of Soda.. Liquid
Chlorine...Dry Ice..Chlorine Dioxide...HTH
Products... Fused Alkali Products... Sodium
Chlorite Products....Carbonic Gas... Sodium
Methylate

ADVERTISERS INDEX

Refer to Page 80 for Index Classified by Products

Acme Industries, Inc. 1
Armstrong Cork Co. ..... Inside Back Cover

Bateman Foundry & Machine Co., Inc. 81
Binks Mfg. Co. 71
Bower Chemical Mfg. Co., Henry 80

Capital Elevator & Mfg. Co., The 74
Chemical Solvent Co. 70
Chicago Nipple Mfg. Co. 83
Classified Advertising 86
Classified Trade Index ..... 80, 81, 82, 83, 84 and 85
Collier Corp., R. T. 79

Deming Co., The 67
Dersch, Gesswein & Neuert, Inc. 82
Detroit Ice Machine Co. 77
Dickinson & Co., F. B. 67

Enterprise Equipment Corp. 86

Gifford-Wood Co. 16
Greene, Van, R. H. 79

Howe Ice Machine Co. 14

Ice Plant Equipment Co., Inc. 74
Index Coupon & Supply Co. ..... 79 and 84
Industrial Filter and Pump Mfg. Co., Inc. 75

Jamison Cold Storage Door Co. ..... Back Cover

Kehoe Machinery Company, Inc., Robert P. 87
King Zeero Co., The 80
Knickerbocker Stamping Co. 6

Layne & Bowler, Inc. 77
Lilly Co., The 69

Martocello & Co., Jos. A. ..... 5 and 78
Mathieson Chemical Corp. 88

National Ammonia Div., DuPont de Nemours & Co., E. I. 4
National Pipe Bending Co. 73
Nickerson & Collins Co. ..... 74, 77 and 82

Ohio Galvanizing & Mfg. Co., The 69
Ophuls & Associates, Fred 79

Pacific Lumber Co., The 65
Perfection Ice Scoring Machine Co. 11
Philadelphia Pipe Bending Co. 85
Pittsburgh Pipe Coil & Bending Co. 77

Refrigeration Engineering Co. 2
Rempe Co. 84
Rex Engineering & Sales Co. 83
Reynolds Electric Co. 77
Reynolds Manufacturing Co. 71
Roots-Connersville Blower Corp. 81

S & S Vending Machine Co. 67
Shank Co., Cyrus 85
Socony-Vacuum Oil Co., Inc. 3
Solvay Sales Div., Allied Chemical & Dye Corp. 73
Sun Oil Co. 12

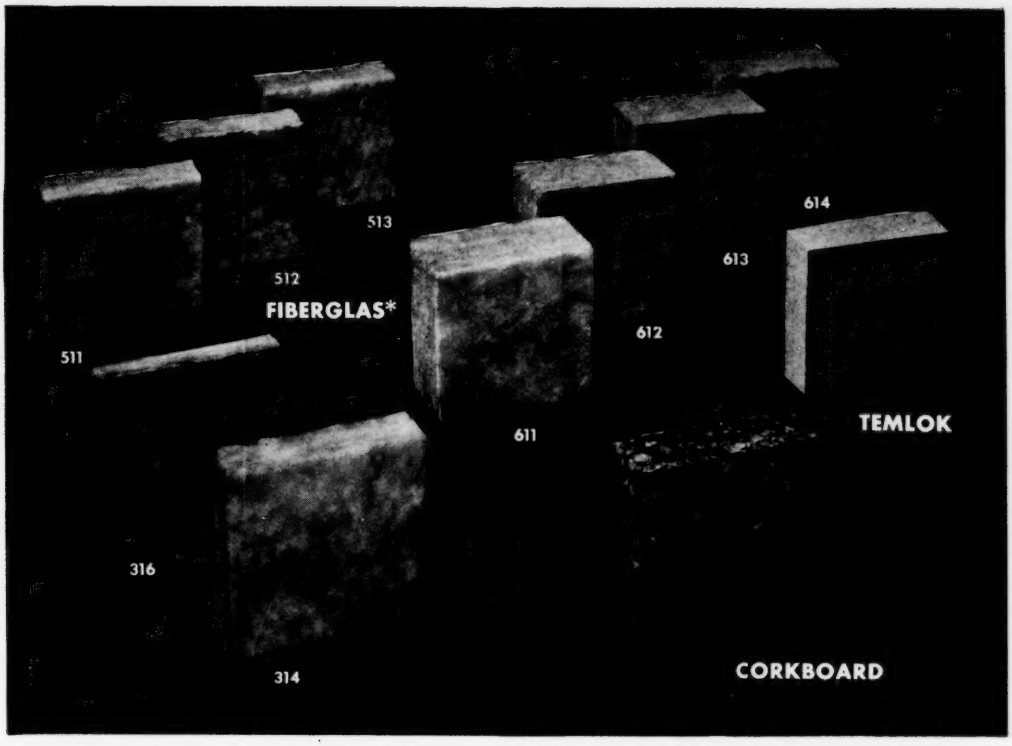
Texas Co., The ..... Inside Front Cover
Thermo Cuber Co., Inc. 8
Towal Mfg. Co., Inc. 79

Union Bag & Paper Corporation 7
United Ice & Oil Supply Co. 79

Vivian Manufacturing Co. 79
Vogt Machine Co., Inc., Henry 10
Voss Co. Inc., J. H. H. 76

Wanted and For Sale Advertising 86

York Corp. 9



No one insulation is best for all equipment

There's no single kind of insulation that is ideal for all types of refrigerated equipment. The insulation that works so well for one manufacturer may be unsuited for another when individual requirements are carefully analyzed.

Analyzing the cost of insulating a piece of equipment goes far beyond the price of the insulation per board foot. Allover insulation costs are additionally affected by the following factors, which vary widely from one manufacturer to another:

Insulation storage expense
Effect of weight on freight charges of finished equipment
Expense of fabricating insulation to size and shape
How insulation affects sealing of cabinets
Labor costs of installing insulation in equipment
Amount of insulation wasted in installation
Effect on compressor capacity
Service costs on unsatisfactory cabinets
Effect on new design, including jigs and dies
Sales costs

Then, there are performance factors that must be reckoned with—effect of insulation on power consumption, condensation and "sweating," load-bearing ability of the insulation, and many others.

Careful analysis of all these factors pays off because it helps you select the insulation you need to build a dependable and efficient cabinet at lowest possible over-all cost. One good way to make sure you've covered every angle is to call in an Armstrong engineer. The advice he gives you can be unbiased because he offers not one, not three, but actually eleven different insulation materials—a complete range. With his help, you can find the one insulating material that will cost you least, serve you best.

For full information, phone the nearest Armstrong office today—or write direct to Armstrong Cork Company, 4502 Queen Street, Lancaster, Pennsylvania.

*Ⓡ OCFCORP.

TEMLOK IS A REGISTERED TRADE-MARK.

ARMSTRONG'S EQUIPMENT INSULATION

LK CORKBOARD • FIBERGLAS • TEMLOK

Ice Plant Operation

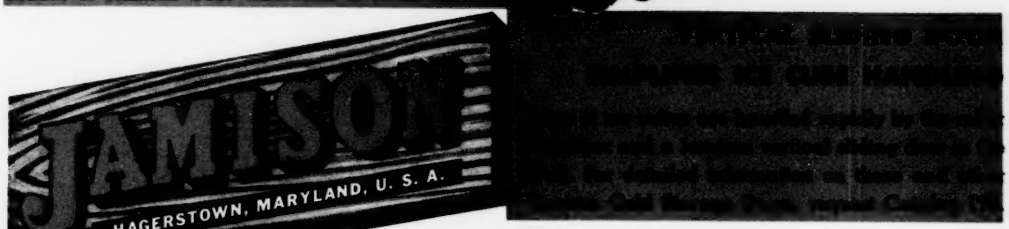
speeded by

JAMISON DOORS

(as seen at the Southern New England Ice Co.)

DOOR CLOSER SAVES TIME AND REFRIGERATION

Ice can be moved out on the delivery dock from when the door closes automatically. Refrigeration is saved, too, because the Jamison Door Closer never forgets to close the door so that full benefit of Jamison Door insulation is obtained.



The oldest and largest builder of cold storage doors in the world

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U.S.A.